

February 1980

ISSN 0002-2675



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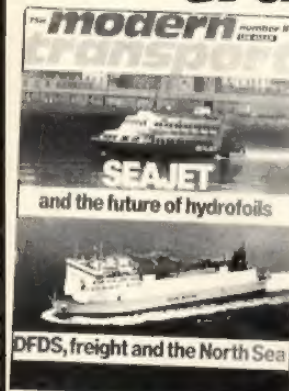
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aircraft ILLUSTRATED

February 1980 Vol 13 No 2

Editor Martin Horseman
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Design Christopher Cusack

Cover: Mirage IIIEE C11-21/111-11 and
IIIDE CE11-26/112-13 of the Spanish Air
Force (Ejército del Aire), climbing into a
cloudless sky over Spain during a
training sortie in August 1979.
Photo: Salvador Mafé Huertas

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Annual subscription rates:
AIRCRAFT ILLUSTRATED: Home or Overseas
(excluding North America £6.40 (post incl).
AIR EXTRA: (published quarterly) Home or
Overseas £2.80 (post incl). Payments should
be made by direct transfer to our Post Office
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to the Subscriptions Department of Ian Allan
Ltd and the envelope clearly marked 'SUBS'.
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tions with Sky Books International Inc, 48
East 50th Street, New York NY 10022, USA.

Published by
IAN ALLAN LTD
Terminal House Shepperton TW17 8AS England
Telephone: Walton-on-Thames 28950
Printed by Ian Allan Printing Ltd at their works
at Cumberlands in Runnymede, England

FEBRUARY 1980

Frontispiece: In the carrier's striking
colour scheme, Ethiopian Airlines'
newest addition is seen over snowy
Mt Rainier, Wa during its maiden test
flight. The airline recently took delivery
of its first B727s for use on regional
routes in Africa and to Europe.
Photo: Boeing

Above: The Bell Model 412, an
advanced technology, four-bladed
variant of the twin-turbine 212, seen
during an early test flight. The aircraft is
scheduled to receive FAA certification
this year with first deliveries in 1981.
Photo: Bell Helicopter Textron

The Editor is pleased to receive submissions
of articles and photographs for possible in-
clusion in Aircraft Illustrated and Air Extra. In
the event of acceptance, payment will be
made upon publication of the material.
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in dealing with article and photo sub-
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unable to accept any responsibility in the
event of the loss or damage, howsoever
caused, of manuscripts or other material.

Paul Humphreys

IT WAS JUST nine months ago that *Airscan's* cartoonist, Nod, drew a highly imaginative cockpit instrument panel in which cathode ray tubes occupied a large part of the available space. The fact that they showed BBC 1 and ATV test cards, plus a lot of interference and the 'Normal service will be resumed...' message, clearly was intended to be taken with a grain or three of salt. The cartoon was in reference to a news item that Boeing is to develop electronic flight-deck displays, a not totally unknown concept on this side of the Atlantic.

Now comes news that one of Boeing's major competitors — possibly the main competitor in the 767-sized field — is on the same track. Airbus Industrie has firmed up the design of the A310 cockpit and has made some quite radical innovations. With one of those fashionable acronyms — FFCC (forward facing crew cockpit), the new A310 will have all the controls and instruments grouped on the front panels, so the standard flight engineer's position will become an aching void. Digital presentations and CRTs for displaying instrument readings are features of this FFCC, in which all the crew face the way they're going.

This idea is not simply a slavish copying of Boeing or any other outfit. Neither is it brashly new. Airbus Industrie and its forebears have worked on this type of layout for some 12 years, but almost inevitably, it was the advent of the microprocessor which enabled the European company to capitalise on its long-term efforts and produce the FFCC with what it claims is a substantial technical lead over Boeing.

But apart from the physical facts that the drivers' cab and the dashboard are keeping up with the times, what other benefits will crews enjoy? Airbus Industrie's General Manager, Roger Beteille, reports that the FFCC will allow them to rely on their sense of judgement rather than memory (which seems an odd turn of phrase) to assess the seriousness of a situation. They will be aided in this critical operation by warning indicators. This lets all the dogs see the rabbit and reduces work load, which must be a positive contribution to increased safety.

Does your columnist hear cries of 'At last!' Of the 375 or so words which the Humphreys pen has so far written 'increased safety' are the most important.

A survey of accident reports has shown that many could have been averted if only the crews of the aircraft involved had had the benefit of an instantaneous situation presentation. A number of incidents spring to mind, most recently the American Airlines DC-10 which shed an engine on take-off at Chicago last May, and the Air India 747 in which the failure of an attitude direction indicator resulted in the aircraft going down into the Arabian Sea with wings vertical.

Knowledge is power in any situation; it can mean life to the passengers and crew of an aircraft. Any new technology or design trend which makes flying safer is a welcome addition to the current inventory of design-for-safety features in modern aeroplanes.

Journalistic judgement

These words are being written as news comes in of yet another tragic accident involving a DC-10. It's the old DC-3 story all over again. Thirty years ago every time the daily newspapers appeared they seemed to carry a report of a DC-3 loss somewhere in the world. One reason, of course, was that there were hundreds of the type in service; another contributory factor was that very many of them had seen war-service of one kind or another and were a bit teased out. There is no similarity whatsoever in these respects between the DC-3 and the DC-10, only that the great Douglas company — now a Division of McDonnell Douglas Corp — is, once again, being put on the rack of world press publicity. Inevitably, in the interests of increased circulation, the instant judgement headlines employ all the 'shock-horror-kerboom' words which are anathema to you and me. There have been calls for grounding of all DC-10s — 'the jinx-jet' — and even before the black-box flight recorder and the cockpit voice recorder have been recovered and their contents analysed, all kinds of reasons for this accident are being aired.

All this pie-in-the-sky is pie-in-the-eye for McDonnell Douglas who must be

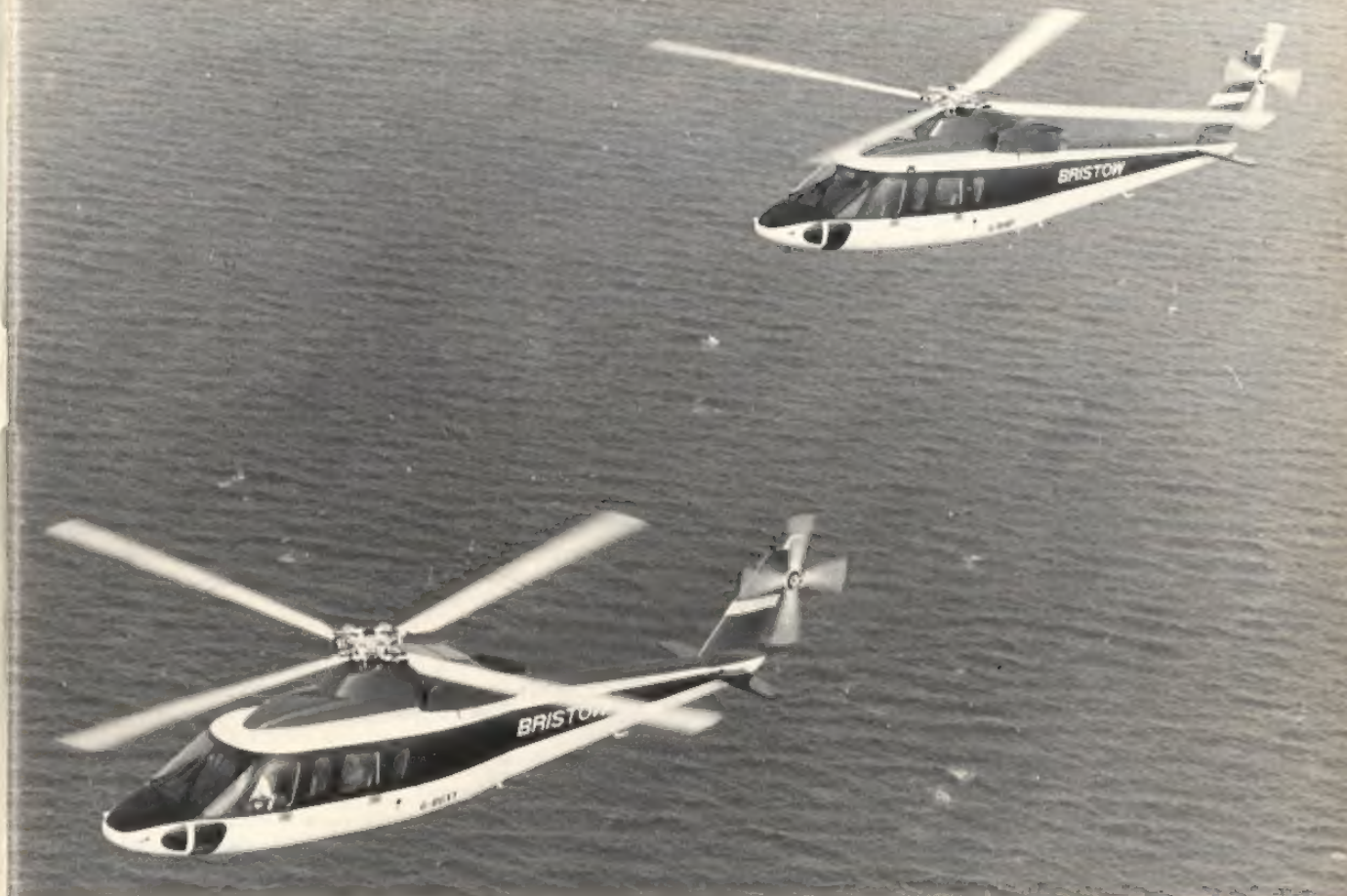
pitied for the public pillorying they are suffering yet again. Thus this is neither the hour nor the column to recap the daily press's kite-flying act, but to express the hope that by the time that this *Aircraft Illustrated* appears the record will have been set straight and we shall know some of the facts, and maybe the reasons, of what happened down there in the Antarctic over Mt Erebus. More important, perhaps, is the hope that whatever lessons can be learned from the recovered black boxes and on-site investigations, they will be applied with all the energy, enthusiasm and despatch necessary to promote the continued safe operation of this aeroplane.

RAF statisticians in doghouse

Oh dear, oh dear: when will the Royal Air Force get its sums right? A decade ago its vast computer-equipped Personnel Management Centre failed to make the correct 'calcs' on its future pilot needs and the result was the current shortage of jet-jockeys. It woke up to the fact just two years ago and began offering 12 year short-service commissions, a scheme it had dropped in 1968.

But manpower is not the sole shortage to afflict the RAF. Your man Humphreys has been hounded by reports that there is such a howling need for dogs that a special drive was launched at the turn of the year for a large number of canine recruits. There is no suggestion that they will be trained to fly the Bulldog, but merely to walk, paw-in-hand, with RAF Police dog-handlers on their nocturnal — and diurnal — patrols around air bases and stations. So come on lads, if your parents had four legs and came from Labrador or Alsace, or if you're good at retrieving things, why not give your local Recruiting Office a bark?

Below: Keeping a low profile at Kai Tak, with its paint scheme blending into the surroundings, is the Royal Hong Kong Auxiliary Air Force's new Cessna Titan, HKG-4, delivered in early-October 1979. Photo: Avia Press



airnews

RAF deployments in the new decade

As part of the RAF's re-equipment programme during the early 1980s, its Vulcans and Buccaneers are to be replaced by Tornado GR1 aircraft and the Airborne Early Warning (AEW) Shackletons by AEW Nimrods.

It is proposed to deploy the first three front-line squadrons of Tornados, entering service by 1982-83, to RAF Marham near Kings Lynn in Norfolk (two squadrons) and RAF Honington near Bury St Edmunds, Suffolk (one squadron). The Vulcan Operational Conversion Unit and two of the three Vulcan squadrons at RAF Scampton near Lincoln will be disbanded during 1981-82, and the four Vulcan squadrons and the Vulcan Servicing School at nearby RAF Waddington will be disbanded from 1982. The two Victor tanker squadrons, which will remain in service, and the Victor Operational Conversion Unit at present at RAF Marham will deploy to RAF

Scampton during 1981-82, while No 208 Squadron Buccaneers and the Buccaneer Operational Conversion Unit at present at RAF Honington will be disbanded in 1983.

The new Nimrod AEW squadron will form from 1983 at RAF Waddington, while the AEW Shackletons of No 8 Squadron, at present at RAF Lossiemouth, will be phased out over about two years from 1983.

Developed U-2 orders

Lockheed has received a contract worth \$42.4million (£19.3million) for two TR-1A single-seat aircraft for the US Air Force, and one ER-2 earth resources aircraft for NASA (National Aeronautics and Space Administration). Work was started on the TR-1, which is a development of the U-2 high altitude reconnaissance aircraft, in 1978 with a \$5million contract for pre-production tooling and facilities. The original agreement was for 25 aircraft, beginning with two TR-1B two-seater trainers in 1980. Because of a change in the USAF plans these have been deferred in favour of the single-seat aircraft now ordered and the ER-2 which is an additional purchase.

Above: Two of the initial four Sikorsky S-76 Spirit helicopters delivered to Bristow Helicopters, G-BGXY and G-BHBF. Photo: Sikorsky Aircraft

Fourth year production of Black Hawk authorised

On 13 November 1979 the Sikorsky Aircraft Division of United Technologies Corporation received authorisation from the US Army to proceed with the fourth year production programme for 94 UH-60A Black Hawk utility transport helicopters valued at \$257.3 million. The announcement brings the total number of Black Hawks ordered to 255 and total value of UH-60A contracts to \$600 million.

The first production Black Hawk rolled off the final assembly line at Sikorsky's Stratford, Ct plant in late-September 1978 and was delivered to the US Army's 101st Airborne Division (Air Assault) a month later.



Maiden flight of Gulfstream GIII

The new Gulfstream American GIII executive jet, powered by Rolls-Royce Spey turboprops, made its maiden flight from Savannah, Ga on 2 December 1979. The flight, which lasted nearly two hours, was described as a significant milestone in the Gulfstream-series development programme.

The GIII is the third Gulfstream execu-

tive jet to use Rolls-Royce power. 200 Gulfstream I aircraft, powered by Rolls-Royce Dart turboprops, have been made, and over 250 Gulfstream IIs, which are powered by Spey turboprops have been sold; Gulfstream American also plans to produce a commuter version of the GI, with up to 32 seats. A distinctive feature of the GIII will be fuel-saving 'winglet' tip extensions which contribute to the aircraft's increased range of up to 4,100

miles. To date, Gulfstream American has taken orders for over 50 Spey-powered GIII aircraft with deliveries scheduled to begin early this year.

New pilot college at Cranfield announced

On 29 November 1979 it was announced that Cranfield, Beds is to be the site of a new UK pilot training school — The Cranfield Airline College. The privately funded enterprise is to be purpose-built in the University surroundings at the Cranfield Institute and it is scheduled to become operational in late-1980.

The school will be equipped with the Gulfstream American Tiger (for basic handling instruction); Cheetah (for cross-country flying); and the larger Cougar (for twin-engined conversion and advanced instrument flying).

theatre familiarisation for the AWACS crews and servicing experience for USAF ground personnel.

It is reported that the French Air Force (*l'Armée de l'Air*) is to form a fifth strike fighter squadron early this year: the unit, based at Istres, will operate Jaguars.

The first of 271 'stretched' C-141B Starlifters was redelivered to the USAF on 4 December 1979. The programme incorporates the addition of an extra 23ft 4in to the fuselage length and the installation of an air-to-air refuelling system. Eighty aircraft are scheduled to be delivered this year and the programme will continue until mid-1982.

Fairchild Republic has received a second contract from Boeing to build components for the B767. The company has been selected to build the leading edge wing slots of the aircraft and, like the previous contract awarded to Fairchild in October 1979 for fuselage sections, the deal is for 200 ship sets with options on a further 200.

The second prototype of the Gates Learjet Longhorn Series 50 widebody business jet made its first flight on 15 November 1979. The aircraft has joined the first prototype in the flight test programme.

Rolls-Royce Limited has formed a wholly-owned subsidiary company named Rolls-Royce (India) Limited with an office in New Delhi. This new company, which is registered in the UK, has been formed to strengthen links with India, Bangladesh, Sri Lanka, Nepal and Bhutan.

AIRCRAFT ILLUSTRATED



Airline Orders and Deliveries

Airline	Aircraft	No	Ordered	Delivery date	Notes
Aerolineas Argentinas	Boeing 747-200B	2	June 1978	October 1979	
Air Algerie	Boeing 727	4	October 1979	n.d.	
Air California	DC-9 Super 80	2 firm 2 options	5 November 1979 5 November 1979	early 1981 early 1982	Air California is the first US airline to purchase the DC-9 Super 80.
Air Madagascar	BAe(HS)748 srs 2B	3	3 December 1979	late-1979 (1) & 1980-81 (2)	The aircraft have been brought for the airline by the Govt of Madagascar and will be used on domestic routes.
All Nippon Airways	Boeing 747-100B (SR)	1	27 June 1978	October 1979	See <i>Aircraft Illustrated</i> , September 1978, page 425.
Aviaco	DC-9 srs 34	1	July 1978	31 October 1979	Aircraft is c/n 925.
Bahamasair	BAe(HS)748	1	11 January 1979	November 1979	Delivery of the final aircraft of the order reported in <i>Aircraft Illustrated</i> , March 1979, page 111.
Bristow Helicopters	Sikorsky S-76 Spirit Sikorsky S-61N	10 3	21 November 1979 21 November 1979	commencing 1982 spring 1980	The S-76 contract, valued at approximately US \$16million, brings Bristow's Spirit orders to 20 aircraft — initial deliveries, of which, have already begun.
Brymon Airways	DHC Dash 7	2	late 1979	mid-1981	
Delta Air Lines	Boeing 727	1	1978	October 1979	
Eastern Air Lines	Boeing 727 Boeing 727	10 2	October 1979 28 July 1978	n.d. October 1979	Continuing deliveries and a follow-on purchase against an order reported in <i>Aircraft Illustrated</i> , October 1978, page 447.
Ethiopian Airlines	Boeing 727	1	December 1978	October 1979	Completion of an order reported in <i>Aircraft Illustrated</i> , May 1979 (also see January 1980 issue).
Federal Express Corporation	Boeing 737-200C	1	October 1978	October 1979	Continuing deliveries under an order placed in October 1978 (see <i>Aircraft Illustrated</i> , January 1979, page 8).
Flying Tiger Line	Boeing 747-200F	1	n.d.	October 1979	
Frontier Airlines	Boeing 737	1	May 1978	October 1979	Another delivery under the order reported in <i>Aircraft Illustrated</i> , August 1978.
Interlease	Boeing 737	1	n.d.	October 1979	
Japan Airlines	Boeing 747-200B Boeing 747F	2 1	October 1979 October 1979	n.d. n.d.	This new order follows the completion of another involving the type (see <i>Aircraft Illustrated</i> , October 1979, page 464).
Malaysian Airline System	DC-10 srs 30	1	29 November 1979	early-1981	The aircraft, the third DC-10 purchased by the airline, will be used on MAS' routes connecting Malaysia with London and other European cities.
Orion Airways	Boeing 737	1	October 1979	n.d.	Newly formed Orion Airways is a wholly-owned subsidiary of Horizon Travel (see <i>airnews</i> item, December 1979 issue, page 569).
Ozark Airlines	Boeing 727-200	2	October 1978	October 1979	
Pacific Southwest Airlines	Boeing 727-200	1	June 1979	October 1979	See <i>Aircraft Illustrated</i> , September 1979, page 412.
Philippine Airlines	Airbus A300-B4 100	1	22 December 1978	28 November 1979	See <i>Aircraft Illustrated</i> , March 1979, page 111.
Piedmont Airlines	Boeing 737	1	August 1978	October 1979	
Singapore Airlines	Boeing 747	1	10 May 1978	October 1979	The aircraft forms part of the order reported in <i>Aircraft Illustrated</i> , July 1978, page 321.
Southwest Airlines (USA)	Boeing 737	1	1978	October 1979	
Texas International Airlines	DC-9 srs 32	1	n.d.	9 October 1979	C/n is 925.
Thai Airways	Boeing 737	1	6 July 1978	October 1979	See <i>Aircraft Illustrated</i> , September 1978, page 425.
Transamerica	Boeing 747C	3	October 1979	n.d.	Transamerica was formerly Trans International Airlines.
Trans Australia Airlines	Airbus A300-B4	4	December 1979	n.d.	This purchase brings the total number of Airbus on order to 394.
Trans World Airways	Boeing 767 L-1011-100 TriStar	10 firm 10 options 2 firm 3 options	December 1979 December 1979 December 1979 December 1979	late-1982 n.d. 1982 n.d.	A major order for the new Boeing twinjet, and one for which Airbus Industrie had offered the A310. TWA has still to decide on its choice of engine for the B767 — either the GE CF6-80A1 or the P&W JT9D-7R4D, both of which are rated at 48,000lb thrust.
Tunis Air	Boeing 737	1	n.d.	October 1979	
United Airlines	Boeing 727	2	14 July 1978	October 1979	Continuing deliveries against an order placed in mid-1978 (see <i>Aircraft Illustrated</i> , September 1978, page 425).
Wien Air Alaska	Boeing 737	1	April 1978	October 1979	Completion of an order reported in <i>Aircraft Illustrated</i> , July 1978, page 321 (also see October 1979 issue, page 464).
Yemen Airways	Boeing 727-200	1	December 1977	October 1979	See <i>Aircraft Illustrated</i> , February 1978, page 63.

n.d. = no details



airregister

Compiled by A. J. Wright

THE ORION FLEET of Boeing 737s is growing with three registered this month, while the first two of the Laker DC-10 srs30s also appear. The marks G-BGXG to G-BGXI have been reserved for the remainder. Other airlines to join the UK register include an ex-TWA DC-9 for British Midland and a Boeing 720 from Maersk.

Registration	Type	C/n	Owner or operator
G-BFUS	Cessna 404	0455	Northair Aviation Ltd
G-BGTV	Boeing 737-2T5	22024	Orion Airways Ltd
G-BGTW	Boeing 737-2T5	22023	Orion Airways Ltd
G-BGTY	Boeing 737-2Q8	21960	Orion Airways Ltd
G-BGXE	McDonnell-Douglas DC-10 srs30	47811	Laker Airways Ltd
G-BGXF	McDonnell-Douglas DC-10 srs30	47812	Laker Airways Ltd
G-BGXY	Sikorsky S-76	760021	Bristow Helicopters Ltd
G-BGZM	Cessna 421C	0663	Southampton Airport Ltd (N3839G)
G-BHBF	Sikorsky S-76	760022	Bristow Helicopters Ltd (N4247S)
G-BHDB	Maule M5-326	7292C	Capital Aviation Sales Ltd (N5636F)
G-BHEP	Cessna 172RG	0009	Rogers Aviation Sales Ltd (N4668R)
G-BHFD	DHC-6 Twin Otter 310	434	Loganair Ltd (N26KA)
G-BHFG	Stampe SV-4A	45	Kirk Aviation Ltd (F-BJDN)
G-BHFP	Eiri PIK-20E	20230	H. C. Mackinnon & ptrns
G-BHFR	Eiri PIK-20E	20228	G. Machie
G-BHFX	Cessna 441 Conquest	0107	Northair Aviation Ltd
G-BHFY	Beech B58 Baron	TH-1111	Kebbell Holdings Ltd
G-BHGA	PA-31-310 Navajo	7912117	CSE Aviation Ltd (N35397)
G-BHGD	Cessna 421C	0123	Rogers Aviation Sales Ltd (ID-IASC/OE-FLR/N3862C)
G-BHGE	Boeing 720-051	18421	Airline Engineering Ltd (OY-APY/N728US)
G-BHGF	Cameron V-56 balloon	574	I. & H. Seggon
G-BHGG	Cessna F172N	1912	Denham Flying Training School Ltd
G-BHGL	Cessna 404	0055	Northair Aviation Ltd (F-BYAJ)
G-BHGM	Beech 76 Duchess	ME-318	Eagle Aircraft Services Ltd
G-BHGN	Evans VP-1	10383	A. R. Cameron
G-BHGO	PA-32 Cherokee Six 260	780007	L. J. Steward (PH-BGP)
G-BHGU	WMB-2 Windtracker balloon	004	I. D. Bamber & ptrns
G-BHGV	Keirs captive balloon	3	K. J. Faulkner
G-BHGW	Colt 12A balloon	061	Colt Balloons Ltd
G-BHGX	Colt 56B balloon	057	Colt Balloons Ltd

Among several first timers are Cessna 172RGs, Sikorsky S-76s and a Vampire T11. There are also quite a few re-registrations, notable among which is Beech C90 King Air G-OMET. This aircraft formerly carried the marks G-BBKN and G-COTE (the latter being appropriate in view of the owner's name), before its current re-re-registration! Surely a 'MET' forecast is not necessary before the products are worn?

Above: Recorded in last month's *air register*, the Gulfstream II, G-HADI, of Arab Express Ltd. Photo: Geoffrey P. Jones

Above left: Another recent registration (see Aircraft Illustrated December 1979, page 571) is this Cessna 421C, G-OSRF, of Northern Executive Aviation. Photo: Ian MacFarlane

Registration	Type	C/n	Owner or operator
G-BHGY	PA-28R Cherokee Arrow 200	7435086	AF Aviation Ltd (PH-NSL/N5736S)
G-BHHB	Cameron V-77 balloon	170	I. G. N. Franklin
G-BHHO	PA-28 Cherokee 180	7505246	Peter Clifford Aviation Ltd (OO-GBJ/OO-HAO)
G-BHIM	Jodel D112	878	G. P. Badham (F-BIXC)
G-BHIS	Thunder A7-65 balloon	240	Thunder Balloons Ltd
G-BMAB	McDonnell-Douglas DC-9-15	45738	British Midland Airways Ltd (N1057T)
G-BOOB	Cameron N-65 balloon	515	E. M. Ten Houten
G-BVET	Fournier RF-4D	4047	Kirk Aviation Ltd
G-BWKS	Lake LA-4-200 Buccaneer	680	Newell Aircraft & Tool Co Ltd (G-BDDI/N1087L)
G-BZAC	Sikorsky S-76	760018	British Airways Helicopters Ltd
G-EGGS	Robin DR400/180	1443	R. Foot
G-FANZ	PA-23 Aztec 250	7954099	Via Nova International Ltd (N6905A)
G-HALL	PA-22 Tri-Pacer	22-7423	F. P. Hall (G-ARAH)
G-HORN	Cameron V-77 balloon	570	G. J. E. Horn
G-IPRA	Beech A200 Super King Air	88-552	J. H. Ritblat (G-BGRD)
G-JRMM	Commander 690B	11530	Colt Car Co Ltd (N81734)
G-KLAY	Enstrom F-280C Shark	1034	Klay Electronics Ltd
G-LAKI	Jodel DR1051	534	V. Panteli (F-BLZD)
G-MALC	AA-5 Traveler	0664	Air Coventry Ltd (G-BCPM/N6170A)
G-OCAT	Eiri PIK-20E	20226	D. S. Innes
G-OMET	Beech C90 King Air	LJ-814	Attencote Ltd (G-COTE/G-BBKN)
G-OSKA	Beech A200 Super King Air	88-641	Eagle Aircraft Services Ltd
G-PARI	Cessna 172RG	0010	Air Service Training Ltd (N4685R)
G-SALA	PA-32 Cherokee Six 300	7940106	M. A. Lenihan
G-STUD	DHC-6 Twin Otter 310	545	Fairflight Charters Ltd
G-TINA	SOCATA TB-10 Tobago	67	A. Lister
G-VTII	DH115 Vampire T11	DHP40273	J. Turnbull & S. Topin (WZ507)
G-WICK	Partenavia P68B	169	DK Aviation Services Ltd (G-BGFZ)
G-ZEAL	Learjet 35A	275	CSE Aviation Ltd

Transglobe's Twin Otter

Allan Burney

IT HAS ALWAYS been a feature of man's inquisitive nature to investigate, explore and challenge his immediate environment. With the advent of high technology in recent years, however, the number of opposing physical barriers that remain unconquered have diminished (on the Earth at least), and the 'golden' age of pioneering exploration appears to be on

the decline. Nevertheless a feat that has never before been accomplished is a longitudinal (surface) circumnavigation of

Below: Low and slow flypast off a STOL approach by the Transglobe Expedition's Twin Otter G-BDHC during a flight demonstration after the presentation of the aircraft at Fairoaks on 15 November. Photos: Allan Burney



the world — via the North and South Poles, by land, sea and ice.

Presently embarked on this endeavour is the five-person main team of the Transglobe Expedition and on 15 November 1979 at Fairoaks Airport, Surrey the team was formally presented with their support aircraft — DHC-6 Twin Otter 300 G-BDHC. The expedition, led by Sir Ranulph Fiennes, had already departed on the first overland stages of their three-year, 52,000-mile venture from Greenwich on 2 September 1979, so it was left to Sir Vivien Fuchs FRS, a member of the Transglobe Expedition Committee and himself a famous explorer, to receive the aircraft from Mr Trevor Braybrooke, deputy Managing Director of the Chubb group of companies (a major sponsor of the expedition and the aircraft's owners).

'Hotel Charlie' — originally the first British-registered Twin Otter, has been purchased to support the team during their hazardous journeys across the South Polar ice-cap and Arctic ocean. Piloted by Giles Kershaw, its task in 1980-81 will be to fly

provisions and equipment across the Antarctic from Sanae — where the expedition's ship docks for unloading, to Borga where the party will winter. The aircraft will then lay down a vital lifeline of pre-supply depots, and parachute rations and fuel to the Ice Group as they commence their 2,600-mile trek (via the South Pole) to Scott Base on the Ross Ice Shelf; the final phase of air support will be in the Arctic in February 1982 as the team travels over the sea ice to the North Pole en-route to Spitzbergen.

To facilitate operations in these harsh and often hostile conditions, G-BDHC has been refitted with a certain amount of non-standard navigational equipment. These systems will enable Giles Kershaw and his flight engineer Gerry Nicholson to maintain position in a region where the proximity of the magnetic pole makes conventional compass navigation unreliable and where the featureless terrain offers no recognisable landmarks.

With much of the re-equipment programme having been undertaken by

RAE Farnborough, Transglobe's Twin Otter has been installed with: Marconi Omega and combined VLF CMA734 systems and a Sperry GM9 gyro-magnetic compass for accurate positional heading data; and a Plessey PV1712 radio altimeter (with both an audio alarm and normal light indicator) to assist in the height accuracy during low flying, sometimes in poor visibility. Radio communication between the aircraft and ground stations is provided by a RACAL VRN4145 (HF) and BOC306(VHF/FM) transmitter/receiver. G-BDHC has also been equipped with a VHF homing system and its original radio compass has been replaced by a Marconi twin ADF AD380-S. Other modifications include a long-range ferry-fuel system comprising nine interconnected stainless steel tanks installed in the fuselage; a two-fold landing system was scheduled to be fitted at the de Havilland works at Downsview, giving Giles Kershaw the option of touching down on ice or snow with wheels or hydraulically-operated skis.



Above: Forward fuselage details on the Twin Otter.

Above right: Sir Vivian Fuchs (right), receives the aircraft on behalf of the Transglobe Expedition from Mr Trevor Braybrooke.

Left: Transglobe's pilot Giles Kershaw starts-up 'Hotel Charlie' for its demonstration flight.

Photos: Allan Burney



Because of the absence of the latter system during the formal handover ceremonies at Fairoaks, there was little external hardware to distinguish G-BDHC from others of its kind — but the need for any evidence of the aircraft's singularity is immediately dispelled by the resplendent colour scheme. Admired by the many onlookers milling around her, 'Hotel Charlie' was arrayed in a majestic livery of red upper fuselage and blue lower fuselage and tail together with a white cheat line carrying a red and blue pinstripe; the upper mainplane surfaces, however, are finished in black for ease of identification in the event of a forced landing.

Following the official ceremonies, the STOL ability of Transglobe's DHC-6 was

ably demonstrated by Giles Kershaw who flew a most impressive display — during which the chase aircraft (a JetRanger helicopter) appeared to have difficulty in matching the Twin Otter's almost vertical ascent! An opportunity to experience at first-hand the characteristics of STOL operations was then afforded to members of the reception in a short series of early-afternoon circuit flights around Fairoaks.

My trip was to be on the second of three such flights and on boarding the aircraft I was rather surprised to observe a sparsely filled cabin with only a single row of six seats along the port side (the Twin Otter has a capacity for up to 20 passengers); undoubtedly this 'spare' space will be completely utilised to accommodate up to 2,000lbs of payload during the Expedition. So as to observe the operation of the Twin Otter's trailing edge high-lift devices (double-slotted full-span flaps), I seated myself in the mid-fuselage from where a good view of the 'straight' wing was obtained. I had barely strapped in before we were taxiing towards Fairoaks' new 800m paved runway, and, following a brief pause short of the strip (to allow for an inbound aircraft on finals), we lined up for take-off. The throb of the two 652hp Pratt & Whitney engines increased to a more fervent pitch as they 'clawed' against the tension of the brakes. The latter were released and the aircraft pitched forward. The acceleration was firm but not as exces-

sive as I had expected for at a remarkably low airspeed we were airborne and climbing steeply. A bank to port was initiated and we were soon comfortably cruising over suburban Woking. All too quickly we had completed a wide orbit of the airfield and after a low flypast we commenced our STOL circuit and landing; an aspect of the Twin Otter's capability that everyone was most eager to see again.

With settings selected and the large flaps extended, Giles Kershaw throttled back and entered a steep approach angle. The airspeed dropped to an almost imperceptible forward motion and the aircraft seemed to hang in mid-air, suspended almost indefinitely above the runway. The judder of landing was superseded by the roar of reverse pitch but the aircraft slewed noticeably to the left. I wondered why this was so until I realised that the action had been initiated by Giles Kershaw simply to turn G-BDHC around in less space — before we knew it we were facing the minimal amount of runway that we had just landed on and had begun a fast taxi back to the apron!

The flight may have been brief but the experience was enlightening and the STOL performance of the Twin Otter is certainly impressive. No doubt the mere sight and presence of Transglobe's colourful aircraft will provide a welcome morale booster for the ground party of the Expedition as they traverse the Polar regions of the Earth.

Houston Intercontinental Airport

Peter Gilchrist checks-in at one of the fastest growing airports in the US and assesses its development

HOUSTON IS America's fifth largest city. A town of oil, money, world renown medical skills — and Space. Probably best known for its NASA connections — 'Houston, Tranquillity base here, the Eagle has landed' were the first words ever spoken from the surface of the Moon — the city is also the administrative capital of a vast and sprawling area of Texas and the centre of a huge American industrial commitment to oil exploration. The last 25 years or so have seen this community

quadruple in size and its economic growth has been nothing short of startling.

Air services have always been important to the area around Houston. Its geographical location close to the shores of the Gulf of Mexico makes it the most Southerly of all major US cities and communication by surface transport can often be measured in days. Washington is 1,200 miles to the North-east; New York is 1,400 miles; San Francisco and the magnetic holiday playgrounds of the North

California coast are anything up to 2,000 miles away, while the important oil-bearing perma-frosts of Alaska are 3,500 miles North-west of the city limits!

Fifteen years ago Houston was served by the William P. Hobby Airport, a cripplingly small municipal facility only seven miles from the business centre of the city. Despite its three runways — the two principal ones being 7,600ft long — it had reached 'critical mass' at 3 million passengers a year. Runway growth was

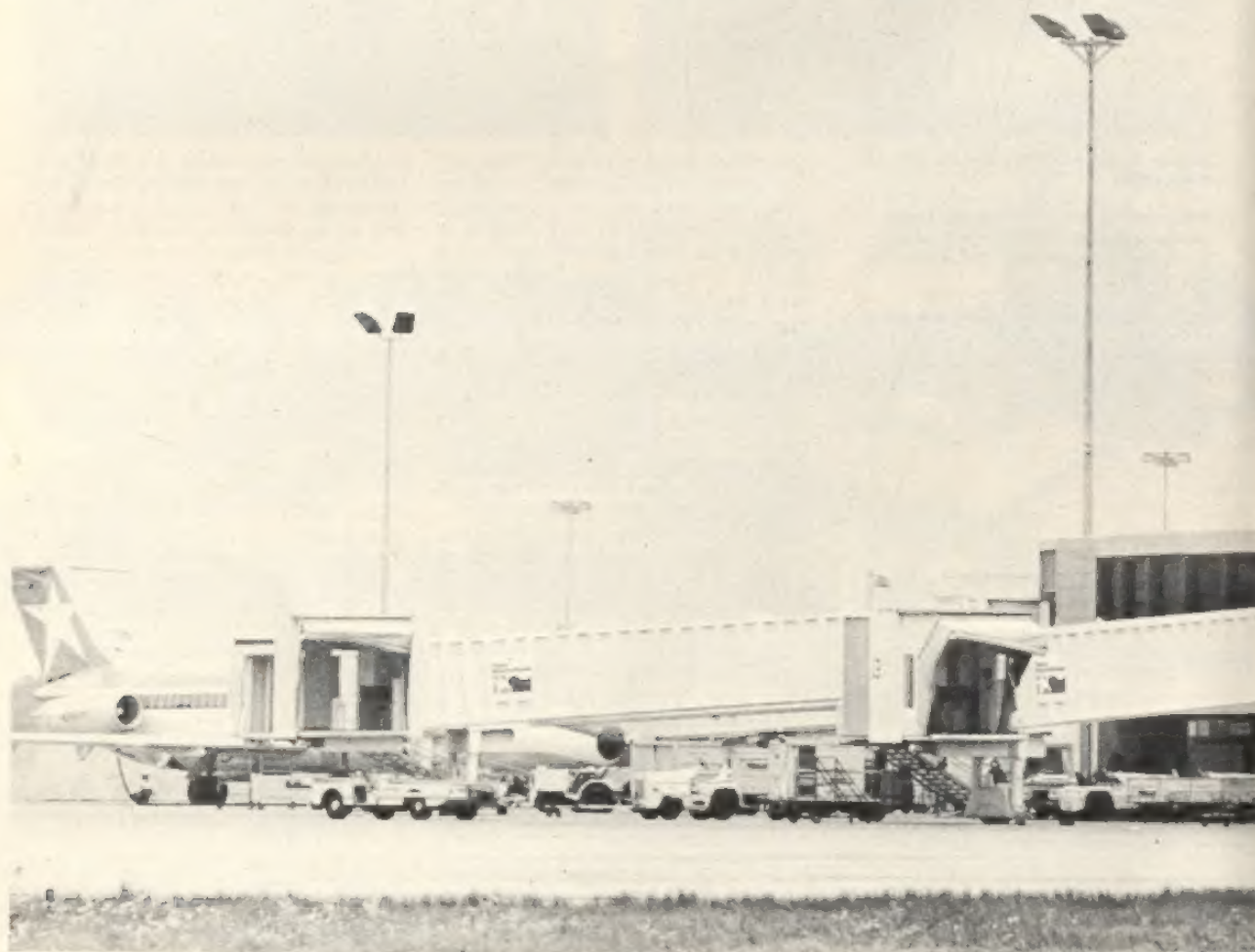
virtually out of the question without carving through huge areas of residential property and Hobby was already looking at 700 movements a day. With an annual traffic increase in percentage terms regularly involving double figures, something had to be done. A brand new airport seemed the obvious answer.

Luckily Texas is not entirely short of open spaces and the city authorities were able to plan around an ideal site 22 miles North of downtown Houston. The new airport was designed to concentrate most of the long range traffic — heavy jets that anger vociferous environmental lobby in the US — well away from residential or commercial areas. This would leave

Hobby to attract general aviation and the smaller commuter airlines, simultaneously reducing the environmental impact of Hobby and eliminating the mixed traffic nightmare from the new airport. Although there is some blurring of the edges, this overall separation now works extremely well because the new structure gives everyone just what they need.

This picture: Overall view of the western end of the central terminal area at Houston Intercontinental with two Texas International DC-9s alongside jetways emanating from one of the Terminal A departure lounges, and the control tower in the background.

Photo: Martin Horseman





The new airport has been named Houston International and is situated mid-way between the Eastex Freeway and Interstate Highway 45 — twin roads that are roughly equivalent to UK motorways. A specially built system of interlinking highways ensures smooth transit from the airport on to either of these major routes into the city.

Initially 8,000 acres were set aside for development and immediate provision was made for two runways and two passenger terminals. Ultimate plans included a third major runway — already funded for the mid 1980s — and two specialised STOL runways. Firm plans envisage at least double the present terminal capacity and land is available for at least one further terminal if necessary (making five in all).

The first aircraft to use Intercontinental's runways arrived in 1969 and the facilities have been progressively opened up since then. Terminals A and B are fully operational and are beginning to acquire the 'lived-in' look that tends to follow in the wake of an under-estimated passenger demand. Already the airport has exceeded 1983 traffic predictions and work on Terminal C has been accelerated towards a target opening date of late-1980 or early-1981. The airport planners are now looking at 1983 for the opening of Terminal D because traffic shows no real sign of peaking-out, although the rate of increase has now fallen to about 9%. Just what impact the Air Deregulation Act will have on these ideas is unknown at the present time, but almost certainly more and more carriers will see Houston as an ideal place to fill their aeroplanes. If they do, Intercontinental could be back into a 20% growth rate overnight.

The present runways are capable of handling any aircraft currently in service, or in prospect for the foreseeable future. The major one — 14/32, running Northwest/Southeast — is 12,000ft long and equipped with full ILS on 14 and a back-beam localiser on 32. Eventually both ends will be ILS equipped. The East/

Top: Boeing 727-22, N7052U, of Allegheny Airlines (now US Air) passes a Pan Am 707 on the north side of Terminal A. Photo: Martin Horseman

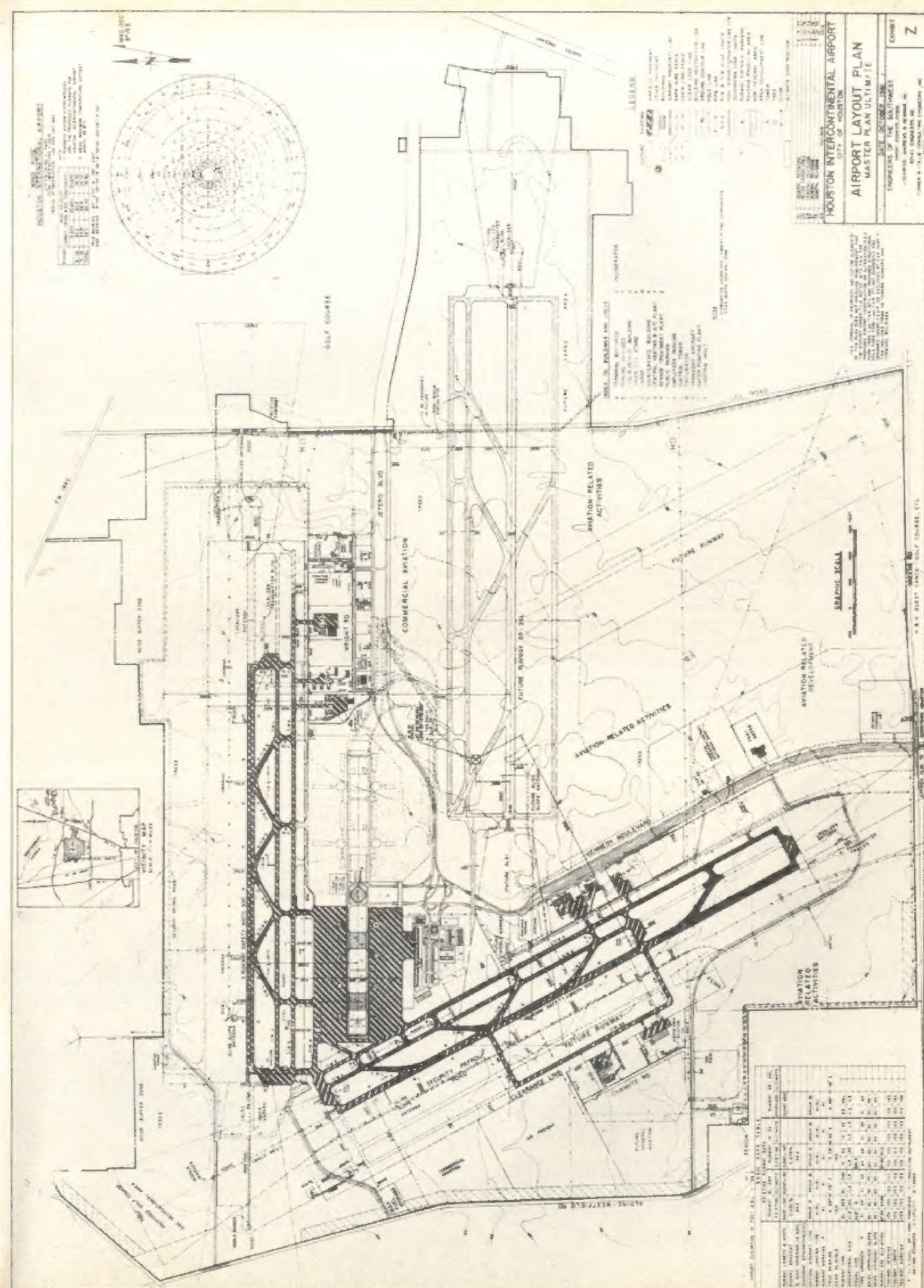
Above centre: A varied line-up on one of the corporate aviation aprons including a Trans International L188CF Electra, N856U; Grumman Gulfstream 2, N62CB; and a North American Rockwell Sabreliner. Photo: Peter Gilchrist

Below centre: Pan Am Boeing 747, N739PA, taxis towards the terminal after landing on runway 14.

Left: Terminal C seen under construction during April 1979.

Photos: Martin Horseman

AIRCRAFT ILLUSTRATED





West runway is one of a parallel pair provided for in the airport master plan and its number — 08L/26R — reflects this provision. At 9,400ft, it is again ILS/LOC equipped, with plans for eventual upgrading to twin ILS. Its length will ultimately be increased to 12,000ft. Both existing

Above: Aeromexico DC-9 srs 15, XA-SOI, at Terminal A's Gate 30.

Below: Eastern Air Lines A300.B4, N204EA, seen during a turnround at 'IAH'.

Bottom: Beech 99A, N1921T, of Royale Airlines Inc, which serves Houston Intercontinental from Shreveport, La, stands beyond a Piper Seneca II.

Photos: Peter Gilchrist

runways are 150ft wide and have multiple high-speed turn-offs coupled to twin, looped taxiways. These extensive concrete 'road systems' are designed to improve peak-time efficiency by allowing an aircraft to clear the runway area without having to slow down to a virtual stop. Both taxiways will also double as STOL runways until the final ground plan is complete.

So far Intercontinental has managed to exceed every forecast of its potential passenger demand. During 1978 — the last full year for which figures are available — 9,749,425 passengers used the airport and its actual growth during that single year used up almost three years' worth of projections. As an approved US Gateway,

Intercontinental has been added to the route structure of a dozen or so international flag carriers during the last 18 months and deregulation is already beginning to make an impression on this year's figures.

No one really knows what will happen in the future, least of all the airlines. Already they are finding that travellers would rather fly than risk finding gas stations closed and this is putting increasing pressure on all airports. All the Houston Aviation Dept can do is keep building; their present estimates suggest that they will eventually catch up with demand on Terminal capacity but no one is willing to give any promises until 1985-86 — and even that makes people nervous.



Sea Harriers aboard HMS Hermes



THE FLEET AIR ARM'S Sea Harrier Intensive Flying Trials Unit, No 700A Squadron at RNAS Yeovilton, Somerset embarked two aircraft aboard the carrier HMS Hermes between 29 October and 6 November last year, in company with two more Sea Harrier FRS1s from A&AEE Boscombe Down and another from the BAe Kingston-Brough Division flight test centre at Dunsfold, Surrey. The week long deployment involved six pilots and 23 maintenance personnel from No 700A Squadron on what was the Royal Navy's first carrier embarkation of the Sea Harrier, aimed at familiarising both the Squadron and Hermes with the operating procedures of fixed-wing V/STOL at sea. The Squadron flew over 40 sorties during their visit aboard the carrier, encountered no serviceability problems, and found at first hand that the aircraft fitted into its new maritime environment very well: in short, as the Commanding Officer of No 700A Squadron told

Aircraft Illustrated, 'the embarkation was an unqualified success'.

At Yeovilton the Squadron is continuing with the Service's trials of the Sea Harrier and expects to make a further carrier deployment later this year. A full complement of six Sea Harriers was expected to have been on strength just after Christmas and at the end of March this year No 700A is due to become No 899 Naval Air Squadron, the Sea Harrier Headquarters and parenting squadron.

Above: Sea Harrier FRS1s ranged on the aft end of HMS Hermes' flight deck during the operational trials carried out while the carrier was steaming in the Irish Sea.

Below: The pair of No 700A Squadron Sea Harriers prepare for a sortie, while passing astern of the carrier can be seen the frigate HMS Euryalus on plane guard duties. Photos: HMS Hermes





Above: One of the No 700A Squadron aircraft launches from *Hermes*.

Left: One of the Sea Harriers positions for a vertical landing aboard *Hermes* with the No 700A Squadron aircraft seen spotted forward of the island. *Photos: HMS Hermes*

Right: Sea Harrier FRS1, XZ452/'101', of No 700A Squadron at Yeovilton on 24 October last year, just prior to the deployment aboard *HMS Hermes*. *Photo: G. S. Long*

Below: Sidewinder armed Sea Harrier FRS1 XZ450 from A&AEE Boscombe Down seen in the hover above the flight deck. The deployment of the Establishment's aircraft aboard *Hermes* was in support of trials on behalf of MoD/Controller Aircraft leading up to the service clearance of the Sea Harrier. *Photo: HMS Hermes*



Mirage III ^{EE/DE} mission



Salvador Mafé Huertas

CURRENTLY THE longest-serving interceptor in the Spanish air defence network, the Mirage IIIE records this year the 10th anniversary of its service with the Spanish Air Force, the *Ejército del Aire* (EdA). It was in June 1970 that the first eight aircraft arrived in Spain pursuant to a contract which had been signed with Marcel Dassault Aviation in 1968 for the delivery of 30 Mirage III fighters — 24 single seaters and six two-seat operational trainers. The requirement stemmed from the need to re-equip two squadrons of the EdA's Air Defence Command — the *Mundo de la Defensa Aerea* — then operating the F-86F Sabre. These units were Nos 101 and 102 Squadrons (Escuadrones) of No 10 Fighter Wing (*Ala de Caza*) at Manises near Valencia. Conversion training on the delta wing interceptor was conducted in France with a group of pilots and ground crew detached to Dijon for the introductory work up on the aircraft and systems, and returning to start the re-equipment of *Escuadron 101*. With the parent Wing's acquisition of the full complement of Mirage IIIs the unit was re-numbered to *Ala de Caza 11* and its component squadrons became *Escuadrones 111* and *112* each with 15 aircraft and respectively using the call sign prefixes 'Dolar' and 'Rublo'.

While the manufacturer's label for the single and two-seat aircraft is Mirage IIIE and Mirage IIIDE, the EdA designations for the two types are C11 and CE11 and the batches were serialised C11-1 to 24 and CE11 25 to 30; *Escuadron 111* operates the odd-numbered aircraft, eg C11 15, and *Escuadron 112* has the even-numbered machines, eg C11 10.

Ala 11 is today part of the EdA's *Mando de Combate* (Combat Command), or *MACOM*, whose air defence elements also include *Ala 12* with F 4C Phantoms at Torrejon near Madrid, *Ala 14* with Mirage FICs at Los Llanos Albacete, and the computerised early-warning radar network 'Combat Grande' with its central command post at Torrejon linked to all the *MACOM* bases.

The Mirage III Wing contributes to the EdA's interceptor alert force and keeps fully armed aircraft at continuous readiness — at 5 and 15min notice to scramble during the daytime hours and at 15 and 30min during the night. Although the majority of the sorties flown by *Ala 11* relate to the primary air defence mission, training sorties are also flown in the interdiction and counter air roles — about 10% of the programme involving night proficiency training. Besides the Mirage's two 30mm DEFA cannon, air-to-air armament comprises Sidewinder and Matra 530 missiles. Air combat gunnery practice regularly involves training on the TDU target darts towed by Phantoms of *Ala 12*.

There are frequent air defence exercises designed to test the performance of the

interceptor squadrons and these are conducted on both a national and international footing; among the former are the EdA's Exercise 'Red Eye', while the latter include the EdA/USN 6th Fleet joint Exercise 'Poop Deck' and the 'Datex' exercise held in conjunction with the French Air Force. Periodic alerts have raised *Ala 11*'s readiness state beyond the normal peacetime commitment, the gravest situation in recent history having taken place in November 1975 when 12 aircraft were readied for deployment

Above: Mirage IIIDE 112-13 of *Escuadron 112/Ala de Caza 11*, and crewed by Captains Pujals and Romero, rotates on take-off from Manises at the start of the sortie recounted by the author. *Photo:* Salvador Mafé Huertas

Below: Major Carretero and the author aboard Mirage IIIDE 111-14 before taxiing out from the flight line: note the *Ala de Caza 11* badge on the aircraft — three diving birds in blue on a white disc. The Wing's motto, *Vista, suerte y al toro*, alludes both to the matador's traditional task and (in English) to hitting the centre of the target — 'Take aim, good luck, and attack the bull'. *Photo* via Salvador Mafé Huertas



during the confrontation with Morocco over the situation in the former Spanish Sahara territory, but fortunately the crisis was resolved by diplomatic means.

Significant milestones in the Mirage III's decade of service with the EdA have been the achievement of the 10,000, 20,000 and 30,000 flight hour marks recorded in December 1973, June 1976 and October 1978. The accumulation of this flight time has not been without loss, however, and it is unofficially reported that *Ala 11* may receive up to 12 ex-French Air Force Mirage IIIEs in 1980/81 in order to offset the attrition. In the longer term future the eventual replacement type is still uncertain but current speculation centres on either the F-16 or F-18, primarily in view for the re-equipment of the EdA's F-4C Phantoms and F-5 Freedom Fighters, or perhaps the latest single engined delta wing fighter from the Dassault design team — the Mirage 2000.

Flying the Mirage

During the author's visit to Manises in August 1979 a very welcome opportunity was presented of flying one of the *Ala 11* training sorties in a Mirage IIIDE. The morning of the flight began with the daily briefing and weather forecast; and a subsequent extensive briefing about the Martin Baker ejector seat and its survival pack plus the details of the rear cockpit was given by *Escuadron 112*'s flying safety officer, Captain Segura. After this we proceeded to the personal equipment room to kit-up with flying suit, anti g and survival vest, and collected a helmet.

The sortie, an interception exercise, was to be made up of three aircraft — a single-seater C11-21 coded 111-11 flown by Captain Rodriguez and two Mirage IIIDEs, CE11-26/112-13 crewed by Captains Pujals and Romero and CE11-27/111-14 with Comandante (Major) Carretero and the author. We discussed the sortie plan, safety procedures, radio frequencies, etc; and contacted 'Pegaso', the GCI radar control at Torrejon to inform them of our 10.05hrs Zulu time take-off and the call signs — 'Dolar 09' for ourselves and 'Rublo 21' and '22' for the other two aircraft. It was a warm and sunny day, perfect for flying, and we headed off from the crew rooms towards the flight line.

While Major Carretero performed his external walkaround I climbed into the rear seat of aircraft 111-14. A ground-crewman followed me up the ladder and assisted me in finding and fastening all the straps, plus the anti-g, oxygen and radio connections. He removed and handed over the seat, emergency canopy and external stores jettison safety pins, which I placed in the flight box. The Major joined us to check that everything was in order, and then strapped himself into the front

cockpit. Once settled in he was on the intercom, telling me that the canopy was about to be closed and to keep clear of the rail. The canopy hissed down into place, edged a little forward and locked itself. Thus enclosed my immediate impression was of the narrowness of the cockpit, but I found the Martin Baker ejector seat comfortable.

Carretero again came over the intercom advising me that he was starting the Snecma Atar 9C engine; a series of noises to our rear signalled the start and the cockpit began to pressurise. Some final checks and then it was a thumbs-up signal to the groundcrewman standing to our left and we were waved out of the parking spot. The other two aircraft were already taxiing in front of us towards the operational readiness pan (ORP) at the head of runway 30. The aircraft were loaded with 4,000 litres of fuel in fuselage and external tanks, some more of which we burned off while awaiting clearance from the tower and watching a couple of Mirage FICs from Albacete's *Ala 14* making a practice GCA approach.

Eventually we lined up for a formation take-off; Carretero applied the brakes and selected full power and afterburner, and as soon as the formation leader nodded his head the brakes were released. The Mirage leapt forward and a glance at the ASI a few seconds later registered 140kts; the nose wheel was lifted for rotation and at 175kts we were airborne with the gear almost immediately coming up and the engine moved back into dry power. A bank to the left, moving away from some other traffic in the process, and the formation was soon climbing rapidly on a heading of 240° towards the intercept training area in Albacete Province. 'Pegaso' cleared us to 30,000ft and levelling out we established the cruise at Mach 0.92.

During the climb I quickly appreciated the excellent visibility from the rear seat which had been put to good use in photographing the other aircraft in the flight. The noise level in the cockpit was very low with only a slight humming sound from the pressurisation unit just behind me obtruding into the otherwise quiet environment. GCI control cleared us upwards to Flight Level 350 while the other two aircraft broke away to conduct a separate phase of the sortie.

Carretero now proceeded to demonstrate some aerobatics including barrel rolls, a loop, and an Immelmann turn. On finishing, with the aircraft once more restored to a normal attitude, the Major passed control to me for further manoeuvres and for a short while I tried my hand at some more rolls and a chandelle. The responsiveness of the aircraft and its high roll rate was very remarkable.

Next some air combat manoeuvres as we looked out for the other two Mirages on their way to join up with us having finished their exercise. The pair were being vectored towards us for a stern missile attack. We sight the aircraft in our 5 o'clock, some 2,000ft lower and closing. Carretero rolls inverted and makes a 'split S' in the process of which I am pressed against the seat and feel the anti-g suit taking the strain of our 5 g turns. We soon have one of the opposition at 10 o'clock from us trying to disengage via a barrel roll but we manage to position even closer and at 1,800 metres Carretero simulates a Sidewinder launch. The engagement is concluded and we rendezvous with the other aircraft to proceed to a position some 30 miles south east from Manises to engage in some exhilarating formation aerobatics.

Our two companion aircraft break away to return to base and Carretero heads towards one of the low level routes over mountainous country to give me some experience of the aircraft's characteristics at lower altitudes. Running in at 500ft and Mach 0.95 for a skip bomb attack against a water dam, it is a hard ride but nonetheless enjoyable for someone who does not get the chance to experience these sensations every day! Recovering to Manises, we transit at 800ft and 350kts. A 90° break over the airfield and the downwind leg is established at 240kts. The gear is extended at 220kts and we turn in off the base leg to set up the finals at the Mirage III's 'hot ship' approach speed of 190kts. Carretero makes a feather like touchdown on runway 30 and deploys the brake chute as we hit 160kts, the nose wheel touching at 110kts.

All too soon we have taxied back to the flight line and shut-down. In the back seat there is one new convert to the Mirage III the aircraft is everything they told me, and some more!

Acknowledgements: The Author would like to acknowledge the generous help obtained during the preparation of this feature from the Spanish Air Force Office of Information and all the personnel of *Ala 11*, especially Comandante Carretero, and Captains Muñoz, Romero, Segura and Sevillano.

Centrespread colour, overleaf

Overall: EdA Mirage IIIEE 111-11 leads two-seat Mirage IIIDE 112-13 at high level during the sorties described in this article.

Inset left: The classic lines of the Mirage III exhibited by *Ala 11*'s 111-12 on the taxiway at Manises.

Inset right: Flight line view of Mirage IIIEs and DEs at Manises with the nearest aircraft evidently not long back from a repaint.

Photos: Salvador Mafé Huertas



Armed Forces

Six & Seven preview



Issue No 6 of the Ian Allan Ltd quarterly magazine *Armed Forces* is devoted to a survey of the United States Air Forces in Europe (USAFE), and it will be published on 27 January 1980. The issue includes articles on the USAF missions and forces, training and maintenance, readiness and reinforcement, and the operations of the Command's flying partners in Europe — Strategic Air Command and Military Airlift Command. The Commander in Chief USAFE, General John W. Pauly USAF, contributes a Foreword to the issue, which also contains a large selection of colour and black & white photographs plus tabular details showing the USAF organisation in Europe and its conspicuous role in NATO.

Some of the aircraft types features in the specially compiled photographic content of *Armed Forces No 6* are seen in this preview.

Left: F-111Fs of the 48th Tactical Fighter Wing, seven squadrons of the variable sweep wing tactical fighters are based in the UK and these form one of the most significant components of USAFE airpower. Photo: Martin Horsemen
Below left: USAFE's most recent acquisition is the F-4G 'Wild Weasel' variant of the Phantom which now equips the 81st TFS of the 52nd TFW at Spangdahlem AB, Germany. One of the squadron's specialist defence-suppression F-4Gs, modified F-4Es with the under-nose Vulcan cannon replaced by a new avionics pod and with additional antenna located on the upper fuselage and fin-top, is seen outside its shelter before a training sortie. Photo: Chris Buck

Inset left: Another newcomer to USAFE is the A-10A Thunderbolt II close air support aircraft, the new equipment of the 81st TFW, which is currently building up to a six-squadron, 108 aircraft strength at Bentwaters/Woodbridge in the UK.

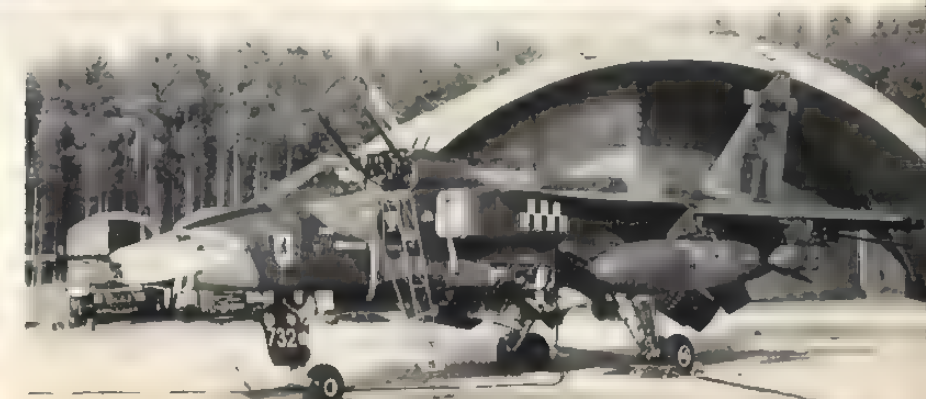
Above: USAFE's air-to-air combat capability has been transformed by the introduction of F-15 Eagle air superiority fighter; a fully-armed 36th TFW Eagle is seen here on the taxiway at Bitburg AB, Germany. Photos: Denis J. Calvert

The future 'Armed Forces'

The 'USAFE' issue of *Armed Forces* will complete an introductory six issues of the magazine which have portrayed the Armed Services of the United Kingdom and the European based forces of the three US Services. From issue No 7 onwards the content of *Armed Forces* will be developed from the previous single Service approach to encompass an international and multi Service coverage, with articles and photo features in each issue on the air forces, navies and armies of the NATO nations and other countries. Planned for inclusion in *Armed Forces No 7* is a report on the biennial Allied Forces Northern Europe (AFNORTH) Exercise 'Bulls Eye' conducted by five of the NATO air arms in late-1979. Seen in these preview photographs are some of the sharkmouth schemes adopted (and surreptitiously added!) to participating aircraft.

Below left: G-91R of the host unit for 'Bulls Eye 79' at Husum AB, Germany, *Leichtes Kampfgeschwader 41* and, (below) a close-up view of the competition badge.

Bottom: The RAF guest team from No 54 Squadron found one of its Jaguars had been the subject of some nocturnal decoration by one of the other teams — XX732 is seen after its visitation. Photos: Michel C. Klaver





RAF Museum's Hanriot HD-1

R. A. Nicholls

THE LATEST in a long line of aircraft to have received the attention of the RAF Museum's Restoration Centre at Cardington has just been completed ready for the move south to Hendon, where it was scheduled to go on display in the latter part of December. It is a Hanriot HD-1, one of only five to have survived to the present day.

Although originating in France the HD-1 did not see service with the French, but was widely used by both Belgium and Italy during and just after the 1914-18 war. A single-seat scout aircraft, the HD-1 was armed with one 0.303in machine gun firing through the propeller, and was powered by a 110hp Le Rhone rotary engine which gave it a top speed of around 110mph.

The Museum's example is s/n HD-75, which entered service with *1^{re} Escadrille, Aviation Militaire Belge*, in 1917; at that time this squadron's complement of pilots included the Belgian aces Willy Coppens, Jan Olieslagers, and Andre de

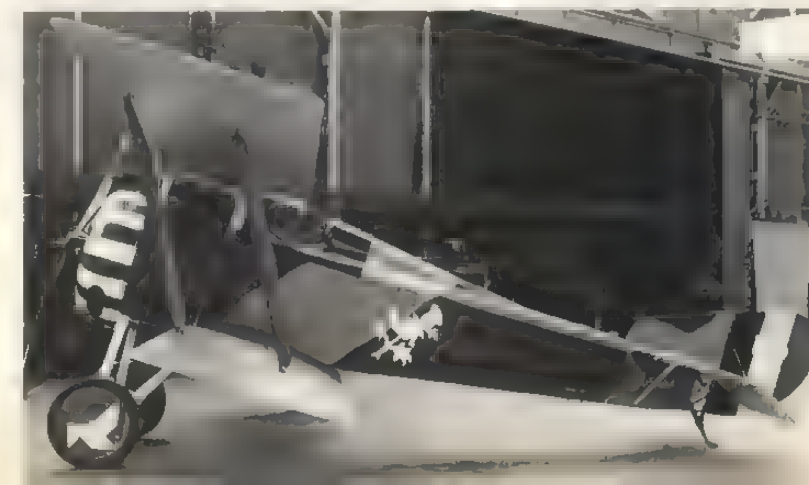
Meulemeester. It is thought that Coppens may have flown this aircraft at some time during its service, though probably not until after the war.

When its military life was over the aircraft flew in civil markings, first in Belgium as OO-APJ and later with the Shuttleworth Trust as G-AFDX. It was sold by the Shuttleworth Trust to Marvin K. Hand, who took it to the USA, where it spent many years in the San Francisco area before Marvin Hand donated it to the RAF Museum early this year.

Although the aircraft was in good condition when donated, having been flown regularly over the years, scrutiny by museum staff at Cardington revealed that it had been covered with a modern man-made fabric, Dacron. With the care and attention to detail for which they are renowned, the museum staff set about stripping the aircraft and re-

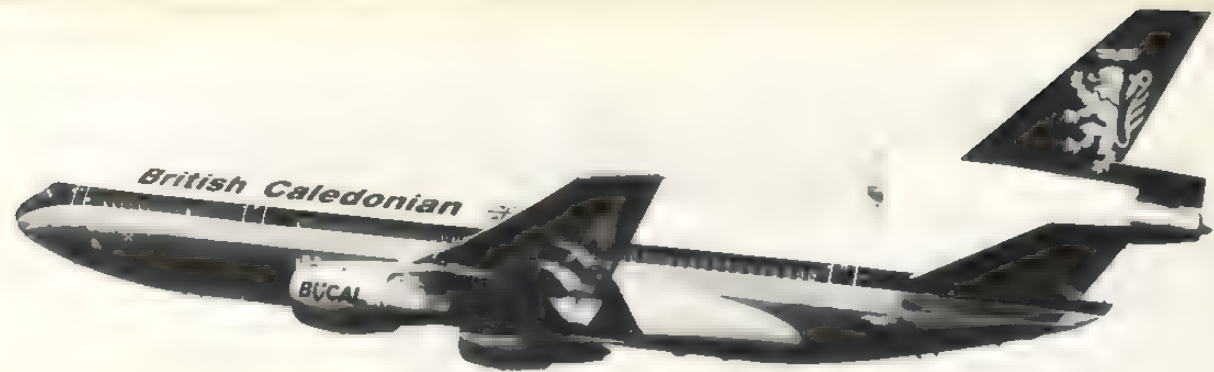
covering it with an authentic fabric. The final touch has been to restore the aircraft to its former glory as HD-75 in the colours of *1^{re} Escadrille* which it wore in 1917; this in itself has involved a great deal of painstaking research to ensure authenticity. The end result is a beautifully restored aircraft which is a credit to all those involved. Once transported and installed at Hendon HD-75 will be on display with the Museum's present collection of 1914-18 aircraft and the Fokker DVII, which made the journey from Cardington at the same time.

HD-75 and the Fokker will be the first aircraft on display in the RAF Museum not to either be of British design or to have served in British markings, and as such they represent a most welcome and interesting broadening in the scope of the Museum.



This page and left: Views of the newly restored Hanriot HD-1 in the RAF Museum's Restoration Centre at Cardington before its re-location for display at Hendon. Photos: R. A. Nicholls

FEBRUARY 1980



'CALEDONIAN Two Forty-Six Heavy'

Martin Horseman

IT WAS mid afternoon at Houston Intercontinental, and for the team of British Caledonian Airways personnel at the airport events were moving steadily towards their daily apex of activity — the arrival, turnaround and return departure of the scheduled DC 10 service from London-Gatwick. The check-in counter had been open for nearly two hours, passengers still to show were presumably aboard incoming connections or some where on the freeway system around the city, and the crew for that evening's 'outbound' was en-route from its hotel. Unseen by the early customers for the London flight, the B.Cal station staff was assembling one floor below the departure lounge on Gate 29. In the subterranean style complex of offices at the base of the terminal pier, the focus of attention was the operations room from which Pan Am co-ordinates the ramp handling contracted to it by B.Cal. Seen from ground level through the ops room windows the apron accoutrements, dominated by the jetway 20ft above, looked giant-size (well, it was Texas!). But for the moment, the ramp remained empty of aircraft although there was a constant stream passing along the taxiway beyond — 727s, DC-9s, 737s, DC-10s, 747s — and several commuter airline Twin Otters scurrying to and from the STOL runway.

For Alan Stronach, B.Cal's airport manager at Houston, and his assistant manager, Emory Brockway, the next three hours would be busy with the orchestration of the turnaround — ensuring all the technical and support functions remained synchronised and that no delays arose in the sequence of the operation. But first everyone was listening out for final verification of the inbound service's status and ETA: at intervals between the paperwork glances were directed at the ops

room clock, as it wound away towards 15.30hrs, and then back at the radio... which was suddenly willed into life:

245 'Pan Am Ops Houston?
Caledonian Two Forty-Five'.

Emory Brockway picked up the handset.

Gd 'Caledonian Two Four Five, Pan
Ops Houston, good afternoon!'

245 'Good afternoon! We are
estimating on the blocks at about
five-five. We have one two eight
passengers, three tons of freight,
the aircraft is basically serviceable;
we would like two wheelchairs for
the arrival please and one crew
declaration form'.

Gd 'Caledonian Two Four Five,
understand estimating Houston at
five-five, aircraft serviceable; we'll
have two wheelchairs available
and one crew declaration'.

A momentary break while we waited for an acknowledgement that had obviously gone astray, and contact was resumed with a revised estimate:

245 'Thanks very much — it looks like
being on the hour now, just about
on schedule I should think'.

Gd 'Roger, we'll look for you on the
hour, your gate will be two-niner,
re-confirm on the ground'.

245 'Twenty-nine, Okay — we'll call
you when we're down, thank you'.

The radio audience relaxed a little at the news that BR245 was still on time and looking good for a trouble-free turnaround. With some 200 miles to run at the end of its 9hr flight the DC-10 would be letting down towards the oil capital of the US Southwest for an on-schedule 16.00hrs local time arrival. Two hours later — refuelled, re-provisioned and re-tagged BR246, the big trijet was due to set out on the return half of its round trip, 'IAH/LGW' as it was simply designated under the origin/destination column of the flight plan. In company with that Friday evening's complement of passengers we were

also to be London bound, observing the progress of '246' on its 4,330nm haul back across North America and over the Atlantic. Unlike our fellow travellers, however, we had been watching the planning of the flight at Houston since early morning, and there was to be a splendid opportunity to observe its realisation in the course of a flight deck ride back to the UK.

By the time the B.Cal office at the airport settles into its recurrent routine the inbound flight will usually have been airborne from Gatwick for two hours or so, the BR245 departure time of 12.40hrs corresponding to 06.40hrs local at Houston. So there is always an immediate indication when everyone comes on duty as to whether it's going to be a normal day — 'did the airplane make its scheduled take-off?', being the operative question. Assuming all is well, one of the first jobs is to fix the wake-up calls for the outbound crew. The office phones their hotel, passes over the names and the time they should be woken, allowing an hour from wake-up to the arrival of their transport. On the basis of an 18.00hrs departure, the crew would be alerted at 15.15hrs for transport at 16.15hrs, which would put them out at the airport by 16.45hrs. The transport itself is set up the same way, and arrangements are also made for the incoming crew who are allowed 20-30min to get through the arrival formalities before leaving customs and walking right out to the transport and away to their hotel. For the inbound crew it will have been a long day, and equally it will be a long night for the outbound crew who are left to sleep in until mid afternoon.

Next the office needs to know the number of passengers expected on the incoming flight and any particular requirements they may have. By 10.00hrs the inbound manifest will have been 'pulled' for comparison with the passenger service message (PSM) telex from Gatwick. The PSM should notify the connecting flights to be made by passengers travelling onwards from Houston as well as other details — any VIPs, members of the airline's Chieftain Club, unaccompanied children, wheelchairs needed for disabled passengers, etc, etc. The PSM is not necessarily foolproof, however; a

Left: Photo montage showing a B.Cal DC-10 ers 30, G-BFGL, and the downtown area of the city of Houston. Photo courtesy B.Cal

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passenger may not have mentioned a separately ticketed onward journey at the check-in, though the connection might have been indicated to B.Cal reservations when booking to Houston. So a final destination other than Houston could be in the manifest and not on the PSM, and the two sets of data are checked back to back to make sure all the arrival contingencies are covered.

The whole process is repeated in reverse with the outbound manifest, and tickets are prepared from the reservation records for issue to passengers who will not have secured them in advance of check-in from other sources such as travel agencies or the airline's downtown offices.

If everything is still running to time and there have been no en-route changes in the inbound flight's ETA, B.Cal opens up its Houston ticket counter to start the check-ins for BR246 at about 14.30hrs. While that might seem rather early about three hours before boarding time — connecting flights can leave passengers an extended stopover and, additionally, with some of today's inexpensive fares now

carrying penalty clauses for not flying on the specified day, passengers are building in extra time for their journeys to the airport in order to be sure of making their departures.

B.Cal's marketing campaign for the Houston-Gatwick service has been emphasising the head start accorded to the carrier's flights from the Bermuda 2 designated gateway to the UK — as the TV commercials in the US put it 'Our service is non-stop', the allusion to continuous on-board attention as well as the direct flight being quite deliberate, of course. The airline has been endeavouring to make Houston a hub for trans-Atlantic traffic and passengers now regularly joining BR246 from origins as far afield as Los Angeles to the west and Denver, Tulsa and Oklahoma City to the north point to the success of the sales programme. Houston's oil industry links with the Eastern Hemisphere and vice-versa, have also triggered significant traffic for B.Cal and its onward connections from Gatwick to UK oil industry locations such as Aberdeen, and to countries in North and West Africa.

Meanwhile, back at the airport office, the reception plan for the inbound flight will have been formulated on the basis of the passenger numbers and needs, with arrival agents on the jetway, the portage service with its wheelchairs if required, and either Alan Stronach or Emory Brockway supervising the scene. The customary procedure is that as soon as the doors are open, the first agent will get the aircraft documents — notably, the general declaration for customs and immigration — and lead the first group of passengers

down to the immigration area. The agents are on hand during entry procedures, baggage reclaim, customs, and flight transfers, and once the passengers are off the crew will disembark. At that point the handling crews access to the aeroplane has to await clearance from US Dept of Agriculture and Customs inspectors, but once these formalities are complete the cleaners and caterers can take over the cabin and galley areas. The housekeeping functions get underway anything between 20-45min after the aircraft has arrived on the ramp — the variation depending largely on how long it has taken to get the passengers off in the first place.

Standing in the ops room and listening to the latter part of the explanation of what was about to happen as BR245 was transformed into BR246, the conversation was interrupted by a call from someone watching the landing traffic, 'There she is!' We glanced towards the runway 14 threshold in time to see the DC 10 flaring for a 15.55hrs touchdown, nicely on schedule. Time for the moment to discuss the BR246 flight plan while '245' negotiated its path round the airport taxiway system.

Generating the flight plan starts with a call to the cargo people to find out how much freight they would like to go on the flight and the office then adds an educated guess on passenger numbers and baggage to arrive at a total payload; the payload plus the empty weight of the aircraft will give a zero fuel weight (ZFW), which is passed to flight departures in London. The details — in effect 'this is our aircraft and our route' — are transmitted from London to a computer in Los Angeles which in the space of a very few minutes replies with a print-out covering the most economical and direct route (ie taking into account the relationship between the forecast winds,

the allotted flight altitude, and the consequent fuel usage), and itemising the speeds, courses, timings and fuel consumption for each sector of the flight. The plan is relayed by teletype to the ops room at Houston and filed from there with the local ATC centre, from where it will be relayed to the en route control centres.

Overhead, the jetway was starting to move into position for the DC 10's arrival, and we stepped out to the apron to watch the 'docking'. Round the corner from beyond the tower came the '245', turning off the taxiway and bearing down on the marshaller waving the aircraft straight ahead to the stand. Sheets of jet efflux washed out the busy airport sights behind the airliner as it towered above us, the fan whine from the huge turbofans rendering further conversation inaudible. The metal finish on the lower fuselage provided a glittering panoramic reflection of the apron, and the letters 'BL' on the nose wheel doors announced that this was G-BL, B.Cal's second DC-10 and named 'Sir Alexander Fleming — The Scottish Challenger'. Once on the blocks and 'off engines', the handling equipment

started to move in on the aircraft's soon unlatched recesses, baggage and containers being extracted from forward and aft holds. Dodging in and out of the ramp traffic Alan Stronach could be seen keeping an eye on everything, before deciding to climb the exterior ladder on the jetway and take a look upstairs.

Within ten minutes the first of the in flight catering vehicles had pulled up alongside the front fuselage in preparation for off-loading the remaining BR245 supplies and re-stocking the aircraft as BR246. Up on the flight deck the B.Cal station engineer was meeting his counterpart in the incoming crew to review any minor servicing demands which had shown during the westward journey and to compare the fuel on board with the anticipated BR246 requirement. In fact '245' had arrived on the stand with 19,000kg of fuel and as the '246' flight plan was recommending a departure with at least 92,300kg it looked as though Bravo Lima's fuel uplift at Houston would get close to 75 metric tons.

Half an hour into the turn and the aircraft was cleared for the cleaning and

re-supply phase — the caterers were established fore and aft and the cleaners were in temporary occupation of the cabins. Down below the fuellers were getting to grips with the task of replenishing the DC 10 with what, in more mundane terms, would be equivalent of fuel enough to drive the average European sized family car for well over half a million miles! The cargo was starting to go aboard and the first cans of baggage were nearly ready for loading.

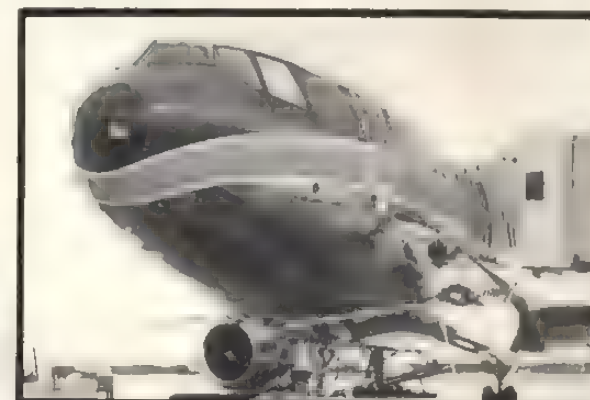
By 16.45hrs the crew for BR246 had arrived at Pan Am operations — Capt Stuart Calder, with Senior First Officer Bill Newman and Flight Engineer Derek Robinson making up the flight deck crew, and a cabin crew of 11 led by Super Chief



This picture: Flight BR245 taxis in from the western end of the airport towards Stand 29 . . .

Above left: . . . advances to dominate the view from ground level . . .

Above right: . . . and is secured to the jetway.
Photos: Peter Gilchrist



KLM





Steve Fisher. The cabin staff proceeded on to the aircraft within a few minutes to conduct their detailed check that all would be in order before the passenger boarding sequence started 40-45min later.

B.Cal cabin attendants work duty rosters which assign them with considerable flexibility to long haul and short-haul services, the result being that they regularly work on all the company's air liner types — BAC One-Elevens, Boeing 707s and DC-10s. Thus the boarding briefings include a quick refresher on the aircraft itself and the allocation of crew responsibilities in the different cabins, followed by the standard checks on the consumables, furnishings, and equipment, liaising with and checking off the ground engineers as soon as the task is complete.

Meanwhile the flight crew had congregated in the operations room having picked up the en-route weather forecast, BR246's North Atlantic tracks and the flight plan. Flight Engineer Derek Robinson departed to rendezvous with the station engineer who acts as the link between the incoming and outgoing crews, and pilot and co-pilot got down to a detailed scrutiny of the flight plan. First off there was some doubt as to whether the computer recommended fuel on board would provide quite the right margin to cover the developing situation at Houston that afternoon. The take-off time was right in the middle of the Friday evening 'rush hour' and the tower was also advising of lengthy, five-minute separations in the out bound traffic. Outside we could see an extended queue of aircraft waiting to gain the runway so it looked as if extra fuel for the taxi-out would be a useful precaution — an extra 700kg was duly added to the load sheet for 246's transit to the threshold.

It was to be a right hand seat take-off by co-pilot Bill Newman, so while he was occupied with the development of departure data, Capt Stuart Calder stood



aside to make his own calculations, which he would then use to check against Bill's numbers. The parameters of the take off were weighed up; flap setting 9.7°, a wet runway (it had indeed been raining very heavily a short while before), the aircraft was to be very close to its maximum take off weight with a full payload and fuel, and we were not going to get any run shortening assistance from the prevailing light easterly winds — at only 8kts and 080°, they would be coming at us from 60° left of the nose on runway 14. Down the left hand side of the Captain's proverbial 'back of the envelope' — as always, the ultimate token of experience — went the customary column of abbreviations to which were applied the reference speeds, the combinations being: V₁-166kts, VR-174kts, V₂-185kts, FU-195kts, SU-250kts, Alpha-283kts. In sequence the data related to: 'Velocity One', the go/no go decision speed; 'Velocity-rotate', the nose up speed for take off; 'Velocity Two', the climb out speed for optimum climb

angle at take-off weight; flaps-up; leading edge slats-up; and Alpha speed, the minimum control or manoeuvring speed without the precaution of re-extending the wing lift-augmenting devices. Staying with the maths, Stuart Calder also jotted down the descent and landing data which would apply to the approach and touchdown at Gatwick some ten hours ahead, and a new day away over the ocean.

The ops room clock moved past 17.00hrs and the crew made ready to leave for the aircraft: we followed them up the ladder to the jetway, through the side door

Above left: Container emerging from rear cargo hold for positioning on a scissors jack unloader.

Above: Left-side view of 'Bravo Lima' on the ramp at Houston and featuring the wing-mounted CF6-50 turbofan engine.

Below: The turnaround in full swing with one of the handling crew checking the DC-10's starboard engine exhaust.
Photos Peter Gilchrist



and into the soft-lit, muzak comforted interior of the cabin. Here we renewed acquaintances with the members of the cabin crew who had been aboard our out bound flight two days before. Yes, they were expecting a full house for that evening's flight and having almost completed the pre-boarding checks were taking a momentary breather before welcoming the passengers. Bidding farewell to Alan Stronach and Emory Brockway, our indefatigable hosts on-station, we went forward to rejoin the flight crew.

The surprisingly small flight deck exuded a cosy atmosphere of orderly and unhurried systems management. 'The days of reading great big long check lists are over', said Stuart Calder by way of explaining technology's acquisition of the workload. 'Most of it is cut up between the engineers when they get aboard; they do a lot of the basic checks so we keep it down to a minimum'.

Thirty minutes from the off saw the pilots reading down the flight plan way points — 'Shreveport, 32° 46.3' North 93° 48.6' West; Memphis, 35° 03.8' North 89° 58.9' West...' — and loading the co-ordinates into the Litton 78 triple inertial navigation system (INS).

Back in the terminal, the last of BR245's passengers were through the inbound for maltrials by about 17.15hrs; the arrival agents had regrouped in the gate area, checked that the cabin attendants were ready to begin boarding, and started to usher the outbound passengers out of the departure lounge. As there is only one jetway the boarding is done by colour coded boarding passes, the rear cabin first as it takes longer for people to get back there, and then the centre and forward cabins closer to the entry door.

After checking the outbound routing, Bill Newman was tuning into the local news' broadcast:

Information Alpha. The twenty three hundred Greenwich weather — three thousand/scattered, estimated ceiling four thousand/broken, one two thousand/overcast, temperature six-six, dewpoint six-four, wind/zero nine zero at eight, altimeter/two nine nine one... ILS runway one four approach in use, departing runway one four and runway eight. Taxiway kilo is closed between taxiway Tango and taxiway Sierra...

Twenty minutes to go, and the crew started a new volley of verbal tennis on the remaining check lists: 'Pre-flight checks'... 'Complete'... 'Pre start checks — Yaw dampers?'... 'Yaw dampers are off'... 'Anti skid?'... 'On'... 'Compasses?'... 'They're slaved'... 'One-thirty, one-thirty, one-thirty'... 'Emergency lights?'... 'Armed'... 'Cabin signs?'... 'Auto and on'... etc. etc.

Ten minutes to go, and confirmation of

our clearances was being sought. Control verified the flight plan and provided '246' with its cue:

ATC 'Yes sir, Caledonian Two Forty-Six Heavy is cleared as filed. Accept Intercontinental Departure One — Lufkin, squawk two five six zero'

Bill set '2560' on the transponder, which would ensure our air traffic radar blip carried the correct code. The load sheet was brought in for the Captain's signature; the ship's papers were stowed; pilot and co-pilot checked the departure pattern for the Lufkin VOR beacon about 80 miles down track towards Shreveport, and then compared notes on the speed references for the take off. We were ready to start.

P2 'Houston Ground, good evening! The Caledonian Two Forty-Six Heavy requesting a push and start off Two Nine please'

HG 'Caledonian Two Forty-Six, Okay — you can push back'

P2 'Forty-Six, clear to push and start, thank you'

HG '... and Two Forty Six, there will be traffic using the STOL runway on your start... keep your power back, if you would'

Another flow of three-way interchanges between the crew preceded the start: 'Brakes on please'... 'Brakes on'... 'Cargo door lights?'... 'Tested and out'... 'Cabin staff?'... 'Have been warned'... 'Ignition selector'... 'Start A'... a burst of dialogue on pressures, and then... 'Thirty psi'... 'Start three'... 'Starting Three'... 'Valve open three'... 'Thirty psi'... and confirmation from the ground crew... 'It's turning'. A twenty second pause and Derek was able to announce... 'It's alright'.

No 1 engine was started in quick succession and the ground crew were requesting 'brakes off please' for the pushback. Bravo Lima was propelled rearwards by the tug, and shoving out from the dusky confines of the terminal we got a good cockpit look at the day for the first time: 'Nice bright day'... 'Mmm... think the weather's gone!'. The centre engine was started during the 'pushback', and when all three were running Bill called up the Tower after completion of the pre taxi checks.

P2 'Houston, Caledonian Two Forty-Six Heavy for taxi'

We were instructed to hold momentarily for aircraft crossing just ahead of us, and

(Part Two of this article will appear in next month's issue)

clearance followed for the trip to runway 14.

The crew began to run through the take off data, ensured full and free movement of the controls, re checked the nav aids were correctly set, flaps at the right angle, and windows shut and locked. The take off procedures were put firmly on the record by Stuart Calder, 'It's a standard right hand seat, we've discussed it...' and if for any reason the PI had to take over, the prescribed transfer of control to the left hand seat would be instantly initiated. Seats... harnesses... annunciator panels... and Derek was reporting that he was 'down to the cabin staff announcement' while Bill was relaying our position to ATC.

P2 'Houston Tower' good evening: Caledonian Two Forty-Six Heavy holding at One Four'

HT 'Caledonian Two Forty-Six Heavy, Roger'

Steve Fisher looked in on the flight deck to advise '239 souls aboard, and cabin crew ready for take off'.

HT 'Caledonian Two Forty-Six, taxi into position on hold runway One Four'

P2 'Two Forty-Six clear to line up, thank you'

Five seconds later the Tower was back with the clearance.

HT 'Caledonian Two Forty-Six, turn left heading one one zero, you're clear for take-off runway One Four'

P2 'Okay, left on to one one zero after take-off, Two Forty-Six Heavy, thank you'

The crew conversation assumed a new degree of incisiveness.

P1 'Your throttles, and I'll tell you when I've finished with the nosewheel, Okay Bill?'

P2 'Okay'

Eng 'Checks are complete'

P1 'Thanks Derek'... 'Okay, round we go and we're on our way'

The 12,000ft of runway 14 straightened out as Bravo Lima swung round on to the centreline, the CF6-50 turbofans were wound up to take off power, and the 250 metric tons of BR246 rolled smoothly into the first mile of its journey.



Save a Sandringham

A project to preserve and return to the UK the former Antilles Air Boats Sandringham flying boat *Southern Cross* is being mounted by Mr Michael E. R. Coghlan of M. M. Aviation and Capt Ronald Gilles. The objective of the venture is to bring the aircraft 'back home' and to operate it for as long as possible in airworthy condition before arranging its honourable retirement to an aviation museum in Britain.

Southern Cross was commissioned at Belfast in 1946 and flew for much of its life with Ansett Flying Boat Services on the route between Sydney, NSW and Lord Howe Is. In 1975 the aircraft joined Antilles Air Boats in the Virgin Is, and it was during its service in the Caribbean that *Southern Cross* deployed twice to the UK — in 1976 and 1977 — to operate pleasure flights along the south coast of England arranged by M. M. Aviation. The flying boat came up for sale after the unfortunate death of her owner Capt Charles F. Blair, president of Antilles Air Boats, in a flying accident in 1978.

Mr Coghlan and Capt Gilles decided to purchase *Southern Cross* to ensure that at least one of the two remaining Sandringhams is saved for posterity, and to operate the craft during air displays and for pleasure flights before its eventual preservation as a memorial to the flying boat era. Capt Gilles has a long association with the Sandringham and before that was a Sunderland pilot flying from Plymouth during WW2. He followed the Sandringhams from Ansett to Antilles Air Boats and flew *Southern Cross* with Capt Blair during the 1976 and 1977 visits to England. Capt Gilles is presently supervising the restoration of

the aircraft prior to its planned return journey in May, and he will then be in charge of flight operations in the UK.

Mike Coghlan told *Aircraft Illustrated* in late November last that work on *Southern Cross* was proceeding well and that he was planning a visit to see the refurbishing programme progress in early December. The aircraft's fuselage had been stripped in preparation for an all-white repaint with a two-tone blue speedline, some of the planing hull plates were being renewed and the starboard outer engine was undergoing overhaul. Powerplant problems are not expected to be significant, however; the other three engines are in good condition with 480hr or less on each of them.

The Sandringham restoration project is naturally going to take a considerable amount of money to accomplish and Mike Coghlan is giving up his garage and vintage aircraft rebuilding business to raise the money for the purchase of *Southern Cross*. But additional help is needed and two forms of financial aid are being sought to help the project. Donations made payable to 'Sandringham Friends (Loan account)' will be repayable and used directly to help certificate of airworthiness work and, if required, part purchase. Donations made payable to 'Sandringham Club' will not be repayable but will form the funds to be controlled by the proposed Sandringham Club committee, yet to be elected, in order to help operate the aircraft and purchase equipment. Among the benefits to be gained by the donations will be newsletters on the progress of the project and, if over £25, discounts on flying ticket prices. Further details are available from: M. M. Aviation, Blandford Forum, Dorset DT11 9NE (Tel: 0258-52593).

AIRCRAFT ILLUSTRATED

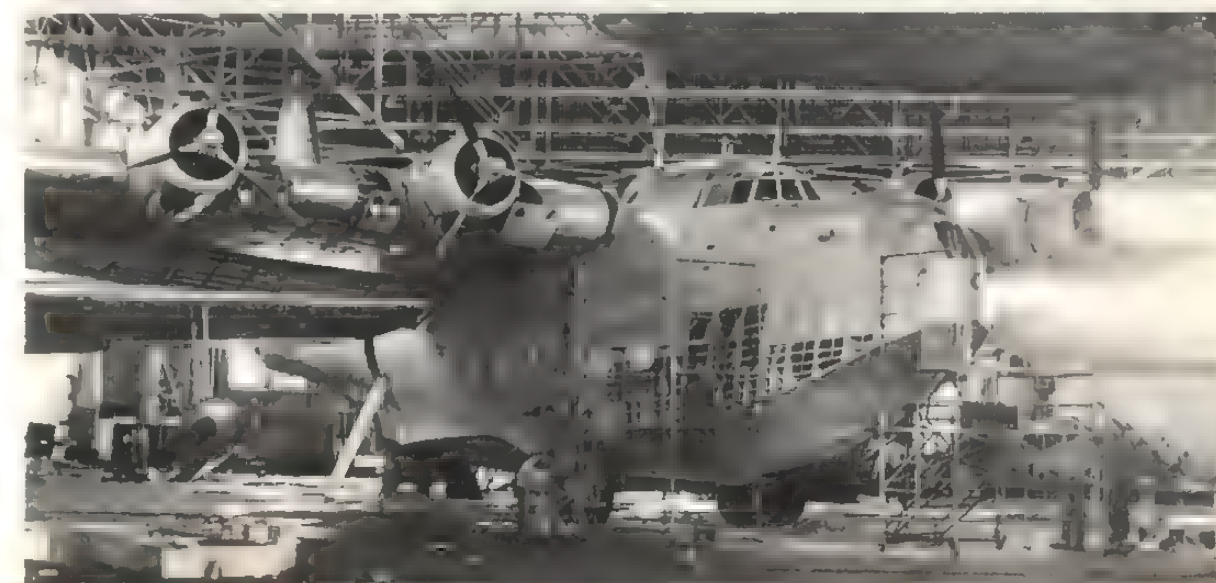
Sandringham surprise

On a visit to San Juan, Puerto Rico, in September last year, writes *Austin J. Brown* from Tortola in the British Virgin Is, I called in at the downtown airport of Isla Grande knowing that the Antilles Air Boats, two Sandringhams were stored there. To my surprise I came across a hive of activity, and it was explained by their resident engineer George Alcock that Resort International, which had taken a controlling interest in Antilles Air Boats, had decided to dispose of the aircraft. Both Sandringhams were carrying US registrations, *Southern Cross* was N158C and *Excalibur VIII* was N158J, these replacing their previous British Virgin Is registrations of VP-LVE and 'E' respectively.

George Alcock, now in his seventies, is the nephew of Sir John Alcock and has worked on Sunderlands and Sandringhams since WW2, having started his engineering career in 1923. After leaving the RAF he moved around the world until joining Ansett and later coming out of retirement to prepare the aircraft for their move to the Virgin Is. In George's capable hands the aircraft are being refurbished anew, hopefully to prolong their flying life well into the 1980s.

Below: A marvellous sight which will be seen again this year if the project to bring the Sandringham back to the UK is successful. Photos Peter Gilchrist

Bottom: Restoration work underway on N158J at Isla Grande. Photo Austin J. Brown





air kits

James Goulding

Canberra PR9

With the release of Matchbox's 1:72 scale Canberra PR9, modellers now have a nice range of Canberra kits from which to choose. Most of the major marks of this splendid long-serving Royal Air Force bomber, interdicator and reconnaissance aircraft are now available in kit form. Airfix has produced a good kit of the B(1)6 or B20, which can be adapted for B2 variants and other B2-based developments. Frog produced a fine B(1)8, which can still be bought from some shops and which may become available through the Novo label. Years ago there was a 1:72 scale Frog PR7, which was rather crude by modern standards but which could provide the basis for a good model, provided that some parts from modern kits are used — particularly undercarriage units. The PR7 is a rare kit but a few may still be in enthusiasts' hands. Revell produce a kit of the Martin B57, which is the American Canberra development, but this model is smaller than 1:72 scale, having been designed to fit a standard box size.

Matchbox's new Canberra, the PR9 high altitude reconnaissance aircraft, is a pleasing model of this most radically altered Canberra version produced in this country (the Americans, of course, produced an extraordinary 'giant wing' version of the B57 for high-altitude recon-

naissance). The PR9 has an enlarged wing area, with greatly increased chord on the wing sections between the nacelles and fuselage. The fuselage is longer than in the bomber variants and a fighter-type canopy B(1)8-style is used.

In many ways this Canberra version looks even sleeker, which says much because this has always been a beautiful aeroplane. Matchbox's model has very good external detail, without the usual deep grooves that adorn so many of this manufacturer's models — which I still would like to see reduced in emphasis. The fighter cockpit is small and little other than the instrument panel and ejection seat can be seen. The reconnaissance bay has optional closed doors or open doors showing internal equipment.

The usual high-quality mouldings are in dark green, dark grey and light brown, and the fit of parts is good. Decals are supplied for three Canberra PR9s. Two of these are in Dark Green, Dark Sea Grey and Light Aircraft Grey finish and are from Nos 13 and 39 Squadrons. The aircraft from No 13 Squadron is in a 1970-deline gloss finish and the other matt. The third aircraft is an Aluminium-painted PR9 as flown by No 58 Squadron from RAF Wyton in 1963.

More geodetics

I was delighted to receive Matchbox's Vickers Wellesley in 1:72 scale, a famous aircraft from the inter-war period that also had a distinguished career in the Middle East against the Italian Forces during the early stages of WW2.

Despite my hopes it seemed extremely unlikely that any manufacturer would

Above: Canberra PR9, XH173, of No 39 Squadron seen at RAF Wyton in mid-1979. Photo: Denis J. Calvert

produce a kit of this long-range single engined bomber. It would not have 'customer appeal' and it would require someone with courage to produce it. Fortunately, Matchbox seem to have a penchant for aircraft of the period between the two World Wars and we have already had some fine models from the company of aircraft of this era. I hope that modellers will support these kits and encourage Matchbox to continue to produce models that are more unusual and less commonplace.

The Wellesley kit makes up into a delightful replica and is full of the character of the real aircraft. The outline shape is very good and the treatment of the effect of stretched fabric over the geodetic structure is subtle and effective. An important point is that the geodetic wing members do not merely criss-cross along the span of the wing, but run to the correct positions in relation to the spars and major ribs. It would have been easy to have just produced a criss-cross effect, but the more difficult form adds to the authenticity of the kit.

The model is constructed in such a way as to permit the modeller to produce either the standard bomber Wellesley or a Long-Range Flight development aircraft. Modellers may wonder why one of the true long-range record Wellesleys was not the subject of this kit, but these special aircraft had different aerial masts and large oil cooler fairings. The development aircraft,

K7717, was a standard bomber, originally operated by No 148(B) Squadron, with the low-drag engine cowlings and fairing adopted for the long range record attempt. These special Wellesleys, of which there were five (L2637, L2638, L2639, L2680 and L2681), together with K7717, were equipped with a Rotol propeller in place of the de Havilland-Hamilton propeller of the standard aircraft. Modellers making up the Matchbox model should note that the propellers have been reversed inadvertently on the instruction sheet and the Rotol propeller, part No 48, should be used on the long-range aircraft and the DH, part No 32, used on the bomber.

The fuselage is assembled in two parts, a major fuselage section with integral fin and rudder, and alternative front fuselages for the standard bomber and the faired engine cowlings. The engine is made in two parts and is a good representation of the Bristol Pegasus. The cockpit is small and adequately detailed — especially if the pilot figure is added. The gunner's cockpit has a Lewis gun on a mounting, but here extra detail could be added to enhance the model. The gunner's canopy is hinged to fold and act as a windscreen, but this is rather thick and some modellers may prefer to mould a new unit of scale thickness.

The special streamlined bomb-carriers, which were such a feature of the Wellesley, are included, but I am sorry that separate bomb doors are not included so that the bomb load can be shown (similar carriers, housing six 1,000lb bombs, were developed for the Vickers Valiant jet bomber, but never used operationally).

Decals are included for two Wellesleys, the long-range aircraft K7717 and a bomber, L2644, of No 14 Squadron. Congratulations to Matchbox for producing this model — let's have more from this aviation era!

What types do we lack?

The past twenty years or so have seen extensive coverage by the World's kit manufacturers of most of the major combat, and to a lesser degree, civil aircraft in a variety of scales. Because they are certain money-spinners, some types, as one would expect, have been favourites with manufacturers. The Spitfire, for instance, has been the subject of some 14 1:72 scale kits, albeit only about three of which have been satisfactory and even these require some alteration. Only two of the fourteen have been Rolls-Royce Griffon powered variants and neither is a good model. Clearly, therefore, we need a good Griffon-powered 'Spit' — perhaps a MkXIV or a Mk21. Personally, I would very much like to see kits of a Spitfire MkIX and a Spitfire Mk21, with common wing/fuselage attachments. These would

permit modellers to combine fuselage and wing components to produce a MkXIV, MkXIX, MkXVIII, and Mk24, with suitable modifications in varying degrees of complication. The MkXIV and MkXIX would be easily converted from the two kits, whereas the Mk24 would require major alteration to the rear fuselage and tail unit. At least, we would have a Rolls-Royce Griffon-powered 'Spit'.

In 1:72 scale there have been three kits of the Ju88 readily available in this country. All three have been unsatisfactory in terms of their accuracy. Revell's kit is available in two forms, the Ju88A-4 and the Ju88C night fighter, and the other two are bomber variants by Airfix and Frog. It is amazing that this most famous of *Luftwaffe* aircraft has not been the subject of more kits, especially when it is remembered that the Dornier Do17/217 series, much less prolific as a species, has been the subject of at least eight kits. Clearly, we need a good Ju88 kit.

We have four kits of the Hawker Tempest in 1:72 scale, two excellent, one good and the fourth less accurate — but Heller's beautiful MkV and Matchbox's fine MkII or VI give us all we require in accurate Tempest kits. But what of the more important Typhoon? Revell's superb 1:32 scale model and Monogram's good MkIB in 1:48 scale satisfy the large model requirement, but the two available models in 1:72 scale are sadly inaccurate and there is a need for a much better kit in this scale.

There are a number of British WW2 aircraft that, in injection-moulded kits, have either not been produced at all or have been the subject of one or two inaccurate kits. The Bristol Beaufort, albeit an important type in its day, has been relegated to one inaccurate kit. The Fairey Fulmar has not been produced in an injection-moulded kit (Rareplanes have an excellent vacuum-moulded kit). The Blackburn Skua has been the subject of one very inaccurate Frog kit. There is but one Boulton Paul Defiant kit, which is rather inaccurate. One feels that this two seat fighter would make a good 1:48 scale subject, with a highly detailed turret.

In spite of its supreme importance and 'glamour' only four 1:72 scale kits of the de Havilland Mosquito have been marketed, ranging from the indifferent to the appalling! Airfix's MkII, VI or XVIII combined kit is the best, but it does have some inaccuracies — so another, really accurate Mosquito in this scale would be welcome.

The Wellington bomber has been sadly neglected; there is the early, rather inaccurate Airfix MkIII and the later, better Matchbox MkX. Frog had a MkIC on the stocks, which may yet appear

through the Novo label, but this too is not entirely accurate. A combined kit of parts for a Wellington MkIC and MkII would be a nice addition to our collections.

The Armstrong Whitworth Whitley, a splendid workhorse in its day — operating as a night bomber, maritime reconnaissance aircraft, troop carrier and glider tug — has been the subject of one solitary, but reasonable kit. Surely, it deserves another and I believe that it would sell.

Matchbox seems to be the only manufacturer interested in and with the courage to produce kits of biplanes, so could I request that one be produced of the Hawker two seaters of the Hart family — possibly a Hind, with additional parts for a Demon. A Gloster Gauntlet, too, would be nice.

We have had several Lancasters and will have more, but the Avro Lincoln has not yet been produced by anyone as an injection-moulded kit — and yet it was an important post-war aircraft.

The Avro Manchester, although unsuccessful as an operational bomber, led directly to the Lancaster and was in service in some numbers. A kit of the triple-finned version would be interesting, as the later twin-finned type could easily be made from Lancaster tail unit components.

Only Revell has produced a kit, albeit a good one, of the Focke Wulf Condor anti-shiping aircraft and this is rather surprising. In general, though, *Luftwaffe* aircraft have been adequately covered.

Of the postwar aircraft the V-bombers — the Vickers Valiant, Avro Vulcan and Handley Page Victor — have never been produced in 1:72 scale injection-moulded kits, and one feels that they are deserving candidates. Doubtless, manufacturers would say that the Valiant lacks the appeal of the other two, but it was in service with a number of squadrons, was used operationally during the Suez Crisis, and was the only V-bomber to have actually dropped atomic and hydrogen bombs over test sites. Surely a kit of the Nimrod maritime reconnaissance and anti-submarine aircraft is long-overdue, and the Shackleton has been the subject of only one kit, by Frog.

There has never been a kit of the Supermarine Scimitar naval fighter, an important type in its day, and only one Attacker kit has been produced — a very old one from Frog and now available under the Novo label.

Of modern aircraft the MiG-21 has only been portrayed accurately in 1:48 and 1:32 scales, and we could do with a really accurate 1:72 scale kit.

Of course there are many other omissions, but it is obvious that there are a great many types still to be produced in satisfactory kits.

airbooks

The German Jets in Combat

Jeffrey L. Ethell and Alfred Price

Jane's Publishing Company

ISBN 0 354 01252 5

10 1/2 in by 11 1/2 in 144pp illus. text

£8.95

This book details the origins, development and service operations of the three German jet/rocket aircraft which went into combat during WW2 — the Messerschmitt Me262, the Arado Ar234 and the Messerschmitt Me163.

These revolutionary and largely experimental aircraft had a history of mixed fortune with early development being shrouded by a high attrition rate. In combat they were too often outnumbered by Allied fighters to be effective; although their high performance was certainly not in doubt (especially that of the Me262). The authors describe the latter as 'the finest all-round fighter in service in any air force at the end of WW2'.

'German Jets in Combat' deals with each aircraft individually presenting a comprehensive text and many outstanding photographs. Altogether a most compelling and enlightening book.

Jane's World Aircraft Recognition Handbook

Derek Wood

Jane's Publishing Company

ISBN 0 354 01221 5 (hardback)

ISBN 0 354 01261 4 (paperback)

5 in by 7 1/2 in 512pp illus. text

£6.95 (hardback)

£4.95 (paperback)

An encyclopaedic work on aircraft recognition which acts both as a programmed learning system and as an indispensable guide to the recognition of over 400 types in service today, ranging from Mach 2 interceptors to agricultural aircraft. The order of the book is arranged by aircraft configuration rather than manufacturer or designation and each subject entry has a photograph, general arrangement drawing and a brief text; there is also a useful 'confusion' reference which lists other types similar in appearance to the subject aircraft.

A brief history of Rochester Airport

Compiled by the Medway Branch of the RAEs

8 1/2 in by 12 in 40pp illus. text

£1*

A softcover booklet on Rochester Airport researched by the Historical Group of the RAEs Medway Branch, which traces the 45yr history and development of the airport from its early days to the present

time. There are some unique photographs, including several memorable pictures of the Short S17 Scylla and the Scion Senior, and the work's three chapters cover 'a brief history', 'the beginning' and 'post war years'.

*The booklet can be obtained by sending a stamped addressed A4 size envelope to: Mr L. E. Fell, Historical Group, Medway Branch RAEs, c/o Marconi Avionics Ltd, Airport Works, Rochester, Kent ME1 2XX

Air War Vietnam

Introduction by Drew Middleton

Arms and Armour Press

ISBN 0 85368 283 6

361pp illus. text

£5.95

An account by the US Air Force of some of the principal campaigns during the 1964-1973 air war in SE Asia plus a chapter on the Mayaguez incident of 1975, this book traces the stories of the crews and aircraft which took part in the 'in country' and 'out-country' missions over South Vietnam and other areas of Indo China. The history is structured in a three fold manner: firstly, around the interdiction operations which most notably above the DMZ were targeted against the Thanh Hoa Bridge, and the Paul Doumer Bridge on the outskirts of Hanoi; secondly, in relation to the role of airpower in stemming the Spring offensive of 1972; and, finally, dealing with the USAF air superiority and bombing operations over North Vietnam. The aircraft, weaponry, tactics and aircrew stories are graphically and objectively described, and complemented by plenty of photographs, maps and diagrams — it all makes for an absorbing and revealing portrait of modern military aviation in action.

Handley Page Halifax —

Aerodata International No 7

Boeing B-17G Flying Fortress —

Aerodata International No 8

Both Philip J. R. Moyes

Visual Art Press Ltd

ISBN 0 905469 50 X

ISBN 0 905469 55 0

Both 11 1/2 in by 8 1/2 in 20pp illus. text incl 2pp colour

£1.95 each

Two more A4 size booklets in the continuing Aerodata International monograph series. The books contain 1:72 scale multi view plans, colour artwork, sketches, photographs and a brief historical survey with leading technical data. A wrap around inside the cover features an outline history of the subject aircraft in French and German plus translations of the photo captions. The discerning aircraft modeller will find these books invaluable for check

ing the accuracy of plastic kits and for constructing scratch built models of the Halifax and Flying Fortress.

British Aviation — Widening Horizons 1930-1934

Harald Penrose

HMSO Books

ISBN 0 11 290297 9

8 1/2 in by 5 1/2 in 340pp plus 32pp illus

£7.95

'Widening Horizons' is the fourth volume in the author's comprehensive history of British aviation and it deals with the years 1930-1934 (previous volumes are: The Pioneer Years 1903-1914; The Great War and Armistice 1915-1919; and The Adventuring Years 1920-1929). All the important decisions and events of these four eventful years are recounted in graphic manner. Harald Penrose's fifth volume of 'British Aviation' will feature 'The Ominous Skies 1935-1939'.

The Illustrated History of Air Travel

Brian Walters

Marshall Cavendish London & New York

ISBN 0 85685 708 4

11 1/2 in by 8 1/2 in 186pp illus. text incl. colour

£5.95

As the title suggests this book traces the story of civil aviation from the early pioneering days of the short-lived lighter than air machines to the giant and supersonic transports of today. The dramatic advances in aircraft technology are fully evident in both text and pictures. With over 150 photographs (53 colour and 106 black and white) the pictorial content is outstanding, and for a publication of this type the price of £5.95 is very reasonable.

No 2 Group RAF — a complete history 1936-1945

Michael J. F. Bowyer

Faber Paperbacks

ISBN 0 571 11460 1

9 in by 6 in 532pp plus 48pp illus.

£3.50

This monumental volume of nearly 600 pages (a paperback version of the original 1974 book), is a chronicle of No 2 (Bomber) Group, from its establishment on 20 March 1936 to its disbandment. The Group was unique in that it was the only formation in the RAF to see action throughout the hostilities and in 5 1/2 years of combat it flew 57,581 sorties at a cost of 910 aircraft losses, and 2,679 personnel killed or missing and 396 seriously wounded.

The Group's roll call featured such aircraft as the Blenheim, Boston, Mitchell and Mosquito, and among its bases were Wattisham, Cottesmore, Thorney Island ... etc. names synonymous with the Group's historical fame.



view

Peter R. March

Microlight aircraft

With little publicity a new chapter in the story of flying in the UK opened at the end of last year when the first microlight aircraft was flown in this country. During the 1970s we saw the rebirth of the hot air balloon, man carrying kites developed into hang gliders, the first successful man powered aircraft, powered hang-gliders and at the end of the decade the development into microlight (or in American terms microkite) aircraft. Although these machines share many features of the hang glider the most significant differences are the use of wheels and the pilot sitting rather than hanging beneath the wing. It would appear that the history of flying is being re-written all over again, but this time using new techniques and materials. We have now reached the equivalent stage to the developments of the pre WW1 era.

Paul and Chris Baker from Bristol together with hang-gliding expert David Garrison had already developed the art of tow launched hang gliding when they decided to take a closer look at the new minimum aircraft receiving publicity in the USA and Australia. Jack McCornack flew his Pterodactyl 3,000 miles across the US from Monterey, Ca to Kitty Hawk in July, reaching a record height of nearly 15,000 feet in the process. It was this 33ft wing span machine that they decided to bring to England.

The Pterodactyl, as the name suggests,

Above: Pterodactyl microlight aircraft coming into land at Wellesbourne Mountford on 25 October 1979.

Photo: Roger Wright

is a tailless aircraft using the latest aerodynamic developments in the Rogallo wing and is powered by a West German made 340cc Sachs two-stroke engine giving 26hp. With a top speed of over 50mph it can cruise at about 35mph using just one gallon of fuel an hour. It will take off in less than 90yd in still air conditions and has a maximum rate of climb approaching 350ft/min. The stalling speed is 20mph and it has an overall weight of under 150lb. There are twist grip controls for the wing up rudders and like the hang glider, pitch is controlled by fore and aft movement by the pilot.

The first pair of Pterodactyls arrived at the 'high school' of hang gliding at Wellesbourne Mountford near Warwick in October and on the 24th of that month the maiden flight was made. News of this exciting development was soon about, and by the end of November there had already been orders placed with Skybikes Ltd (the firm set up to market the aircraft in the UK) for a quartet of Pterodactyls.

At present no firm decisions have been taken by the CAA about the status of the microlight aircraft weighing less than 100kg. The British Powered Hang Gliding Club (BPHGC) at a special meeting on 18 November 1979 decided to co-ordinate experience on construction, flying and training of powered minimum aircraft. There is clearly a need to establish reasonable standards both for construction, and operating these machines, while at the same time not introducing a layer of

bureaucracy that will stifle the sport before it gets off the ground. In the meantime at Wellesbourne the pioneering team have established the Ultralight Aviation Centre and have evolved a training course for would be pilots and owners of Pterodactyls. A further five of these microlights were delivered from the USA in December and three previously delivered were allocated the registrations G BHEY, 'HFA' and 'HFB'. It is hoped to form a demonstration team to fly a trio of Pterodactyls at air shows this summer.

Preservation view

It is good to see that serious attention is now being given to the preservation of air liners. While military aircraft have been secured for posterity by many museums and groups there have been few real efforts to keep examples of airliners. The absence of the Hermes, Argonaut, DC 4 and until recently the Viking have been notable, while the loss of the prototype Britannia some years ago from St Athan was deplorable. Which makes it all the more heartening to record this month (see page 95 Ed) the arrival of Comet 4B G-APYD at Wroughton, Wilts for the Science Museum's Air Transport Collection. In addition VC-10 G-ARVM has arrived at the RAF Cosford Aerospace Museum.

Conditions had to be just right for the VC-10 to make its landing on Cosford's 3,597ft runway on 25 October 1979. G-ARVM was the last Series 1101 built for BOAC and was first flown on 22 July 1964. It has joined Viking G-AGRU and Comet G-APAS in the growing collection of airliners to which it is hoped to add a Vanguard, Trident 2 and Boeing 707 this year.

Also at Cosford, on 23 November 1979, a number of war-time veterans were given an airing to be used as backgrounds by Granada TV for the filming of a follow-up to the *Family at War* series. Dakota KG374, Mosquito TA639 and Spitfire MT847 as well as Messerschmitt 410 420430 were included.

Attention all DC-3 buffs

Ian Allan Travel intend chartering a DC-3 for a one hour flight on Saturday 5 April 1980. The flight will be from Bournemouth (Hurn) Airport around the Isle of Wight and neighbouring South Coast areas. The cost will be £25.00 per person (exclusive of transport to/from Bournemouth). Anyone interested should contact Mr J. Hunt, Ian Allan Travel (Special Events Department), 112 High Street, Brentford, Middlesex TW8 8AT. Telephone (01) 568 6964.



Other items of news include a report from the Shuttleworth Collection that work on the ex-Afghan Hawker Hind BAPC-78 is to be stepped up and it is hoped to have it flying before the end of this year's air show season. At Blackbushe the fantastic Warbirds Collection continues to grow with the arrival on 11 November of P-47D Thunderbolt N47DE from Chino, Ca and P-51 Mustang N166G. Also in prospect are Mosquito RS709/N9797 from the USA and Messerschmitt Bf109G-6 believed to be Werke Nr 16382 from Bankstown,

Australia. These will join Harvard FT323/G-AZSC, Lysander V9281/G-BCWL, B-25 151645/N9115Z and Hunter T53 ET-271/G-9-429 which had already been added in 1979.

After several years neglect piston-Provosts are getting attention from preservationists. Veteran WV494 has been rebuilt at Coventry and made several appearances at air shows towards the end of last year's season. Although registered G-BGSB it is painted in RAF Flying Training Command colours with its former serial. The Loughborough and

Leicester Museum has rescued XF914 from Barton and will shortly decide whether to restore it to flying condition. It had spent some time at Flint Technical College before moving to Manchester. The RAF Museum's XF545 has been re-allocated from Swinderby and is to be exhibited at the gate of Linton-on-Ouse after some attention.

Tiger Moth G-ANLS has been loaned to the Royal Scottish Museum of Flight at East Fortune while the owner completes a posting to Dubai. Another Tiger on the move is G-AFWI which had been used by the RINGS at Lee-on-Solent. It has gone to Yeovilton where it will be restored as BB814 with the RN Historic Aircraft Flight. The RNHAF will also be receiving the ex-Portuguese Harvard 1656 after it has been rebuilt to flying condition using parts from a second machine. It will fly with its former FAA serial EZ407.

Visitors to the tiny airfield at Chirk will find some real preservation gems in the workshops of John Pierce. Already well-known for his work on Rapides it will be no surprise to see the rebuild of G-AJBJ well under way and G-AIUL following it. The latter is using many parts from G-AKRN and could end up adopting this registration. Tucked in amongst these biplanes is DH88 Comet G-ACSP which is being painstakingly restored. Discovered in Portugal where it went in February 1935 the Comet was little more than wreckage. However with much research and skill Mr Pierce and his team have already made good progress with reconstructing the fuselage. There has also been some co-operation with the Shuttleworth Trust's restoration programme for G-ACSS. The prospect of two of these record-breaking aircraft flying again before too long looks to be more than a pipedream.

A further nine additions to the BAPC register are reported as follows:

BAPC 133 Fokker DrI static replica, built by Gp Cpt A. Wilson at Brixham for the

AIRCRAFT ILLUSTRATED



Above left: Not a wartime scene at an airfield 'somewhere in England' but RAF Cosford in late-November last year with the Aerospace Museum's Dakota as the centrepiece for location filming on the *Family at War* series follow-up. Photo: Roger Wright

Left: Provost T1 WV494/G-BGSB after its rebuild at Coventry.

Below left: Restoration work on the Hawker Hind at Old Warden is making progress and it is hoped to have the aircraft flying before the end of 1980.

Above: A new addition to the British Aircraft Preservation Council register is the Fokker DrI replica at the Torbay Museum. Photos: Peter R. March

Below right: A November 1979 visitor to Jersey Airport was Catalina N4760C. Photo: R. A. Hill

Torbay Aircraft Museum, where it is displayed as 425/17 in the Red Baron exhibition.

BAPC 134 Aerotek-Pitts S-2A. Built by Aerotek for Rothmans as a full-size clipped-wing, touring, ground display aircraft it has carried the registration G-RKSF. These markings have now been allocated to a flying S-2A for the second Rothmans team.

BAPC 135 Bristol MIC static replica, built for Leisure Sport and displayed at Thorpe Park where it carries the serial C4912 and is painted in the colours of No 150 Squadron, RFC.

BAPC 136 Deperdussin Seaplane static replica, built for Leisure Sport and displayed at Thorpe Park where it is painted as No 19, the 1913 Schneider Trophy winner.

BAPC 137 Sopwith Baby Floatplane static replica, built for Leisure Sport and displayed at Thorpe Park and is painted in RNAS colours.

BAPC 138 Hansa Brandenburg W29 Floatplane taxi-able replica, built for Leisure Sport and displayed at Thorpe Park where it is painted as 2292 of the German Navy.

BAPC 139 Fokker DrI static replica, built for Leisure Sport and displayed at Thorpe Park and is painted as Richthofen's aircraft.

BAPC 140 Curtiss R3C-2 Floatplane static replica, built for Leisure Sport and displayed at Thorpe Park where it is painted as the 1925 Schneider Trophy winner No 3.

BAPC 141 Macchi M39 taxi-able replica, built for Leisure Sport at Lands End and displayed at Thorpe Park to represent the 1926 Italian Schneider Trophy entrant.

Disposal of aircraft by European air arms has produced an influx of Super Sabres and T-33s from France and Harvards from Portugal. The Fleet Air Arm Museum is the latest recipient of a pair of Harvards; 1657 which was EX976

has joined EZ407 and one of the aircraft should be flying with the RN Historic Flight in due course. At Prestwick the first quartet of Belgian Air Force T-33s FT01, FT02, FT06 and FT11 arrived for storage on 5 November 1979. A total of 14 is expected.

In brief

The RAF Sea King Training Unit (RAFSKTU) concluded its programme at Culdrose last October. With sufficient crews now trained for the initial allocation to squadrons the unit has reduced its strength to two aircraft and become part of No 706 Squadron where it is known as the RAF Sea King Training Flight (RAFSKTF). The remaining Sea Kings are XZ589 and XZ591, while XZ587, XZ590 and XZ592 departed for Brawdy and XZ588 went to the parent unit at Finningley.

At Woodford, Nimrods on the line for conversion to MR2s last autumn were XV254, XV239, XZ281, XV256 and XZ283. They will be delivered to the RAF painted in the new NATO recommended pale brown colour scheme, or 'hemp' as it is known. The first production Venture T3 from a new batch of 25 aircraft was flown at Wombleton on 4 October 1979. The T3 is an improved version of this powered glider featuring an electric starter and other refinements. The prototype XZ551 was first flown on 3 February 1979 and the production aircraft are serialised ZA625-ZA634 and ZA652 to ZA666. Another new aircraft making its first flight



in the autumn last year was the first UK homebuilt Vari-Eze G-LASS. Built by P. J. Callert and partners it was airborne at Biggin Hill on 27 October.

Mildenhall has been host to a number of US strategic reconnaissance aircraft for some time. Lockheed U-2R 10338 was resident for most of 1979 and SR-71A 17976 of the 9th SRW arrived on 18 October. Permanent facilities have now been provided at the base. On 5 December a new contract was signed between British Aerospace and the USAF for modifications to a further 20 F-111s at Filton in the current year. The work is mainly concerned with the escape capsule.

One of the country's best known aviation societies celebrated its 21st anniversary towards the end of last year. The British Aviation Research Group started out in early-1958 as the Blackbushe Branch of Air Britain with just a handful of members. Growing by way of the Blackbushe Aviation Group it is today a flourishing organisation with over 1,200 members. The monthly illustrated magazine *British Aviation Review* produced by the Group is noted for its accurate reporting of the military aircraft

scene in Britain and the continent and is frequently quoted in this column. A special commemorative booklet describing the Groups history and giving a potted account of Blackbushe Airport has been produced. Copies can be obtained from D. J. Allen, 32 Nash Close, Cove, Hants GU14 0HL — price 70p including p&p.

Britannias are rapidly vanishing from the airlines inventories. The latest victim is the Aer Turas 307F EI-BAA. Having been for sale at Manston since April it returned to Dublin on 23 October and two days later work started on reducing it to spares. The other ex-Aer Turas Britannia EI-BCI is now being operated by Redcoat Air Cargo as G-BHAU.

Readers interested in the many comings and goings of Islanders, Defenders and Trislanders have quite a job to keep up, not least with the various depositories of incomplete airframes. Southampton has become the latest under cover store with up to 20 aircraft usually hangared as well as the unfinished machines from the former Gosselies production line (c/n 2021-2043). Also stored here is the Turbo Islander G-BDPR. At Hurn, Airwork Services is repairing the Islanders

G-BELN, G-BESE, G-BESJ and G-BFNL that were badly damaged by gales at Bembridge last year. Pilatus Britten-Norman has had a major sort-out at the Isle of Wight airfield and has set about new production hangars, light aircraft overhaul facilities and perhaps most importantly, a new 3,000ft concrete runway for all-weather operations. Details of Islander happenings can be found in the new publication *Islander Quarterly* which is available on subscription (£2 per annum) from BN Historians 32 Budebury Road, Staines TW18 2AX.

Right: A view of the recently restored F-84G Thunderjet, the only example of the type remaining in Italy, which has been painted in the colours of the famous Tigri Bianche (White Tigers) aerobatic team of the 51° Stormo, Italian Air Force. The aircraft was pictured at Istrana AB near Treviso and is destined for display at the Museo Storico dell'Aeronautica Militare at Vigna di Valle near Rome (see *Aircraft Illustrated*, June 1978, pages 276-279).

Report: Denis J. Jones. Photo: Aviaphotos-Venice

airevents'80

A recap on the notes for the new diary in last month's *airview* plus several new entries to form the first list of the coming year's air events, which will be consolidated into a comprehensive guide in the May issue of *Aircraft Illustrated*, scheduled for publication on 11 April. In the meantime, readers are reminded that some of these dates may turn out to be 'provisional' (ie, subject to later alteration), so pencilled entries in the diary might be in order at this stage.

April

- 7 Shuttleworth Flying Day, Old Warden, Beds
- 13 PFA Wessex Strut Spring Fly-in, Henstridge, Somerset
- 24-1 May. Hanover International Air Show, Hanover, W. Germany

May

- 4-5 Amy Johnson Memorial Air Pageant, Hull (Paull) Airfield, N. Humberside
- 25 Shuttleworth Flying Day, Old Warden, Beds
- 31 Air Squadron Aerobatic Competition, Old Warden, Beds
- 31-1 June. Bristol International Air Festival, Filton, Avon

June

- 1 Aero Day, Blackbushe Airport, Hants
- 1 Air Squadron Flying Display, Old Warden, Beds
- 6 Shuttleworth Flying Evening, Old Warden, Beds
- 7 Open Day, RAF Waddington, Lincs
- 7 Open Day, RAF Church Fenton, N. Yorks
- 15 Duxford Air Show, Duxford, Cambs
- 29 Shuttleworth Flying Day, Old Warden, Beds

July

- 4-6 PFA International Rally, Leicester East, Leics
- 6 Hull Air Show, Hull (Paull) Airfield, N. Humberside
- 12-13 Air Show, Strathallan, Tayside
- 13 Air Britain Fly-in, Old Warden, Beds
- 27 Shuttleworth Military Air Pageant, Old Warden, Beds

August

- 2 RN International Air Day, RNAS Yeovilton, Somerset
- 23-24 USAFE Air Fete, RAF Mildenhall, Suffolk

- 31 Shuttleworth Flying Day, Old Warden, Beds

September

- 1-7 Farnborough International '80, Farnborough, Hants
- 13 Battle of Britain At Home Day, RAF Abingdon, Oxon
- 13-14 Battle of Britain 40th Anniversary Display, Duxford, Cambs
- 13-14 Vintage Glider Club event, Old Warden, Beds
- 20 Battle of Britain At Home Day, RAF Finningley, S. Yorks
- 20 Battle of Britain At Home Day, RAF Leuchars, Fife
- 28 Shuttleworth Pageant, Old Warden, Beds

The PFA Wessex Strut has announced that the Spring Fly-in taking place on 13 April will be at Henstridge as the work on the controversial BBC short-wave radio station due to be constructed on the site will not have commenced by that date.

The Bristol International Air Festival will now be held at Filton on 31 May-1 June and not Lulsgate as previously announced. The event has become too large to mount at a commercial airport.

For some of this month's contributions we are indebted to C&P Baker, R. Bonser, D. A. Conway, J. Guthrie, A. March, D. Rough, R. Wright and D. Young. Also the publications *Air North*, *Air Scotland*, *Air Strip*, *Aviation Ireland*, *British Aviation Review*, *Flypast*, *Irish Air Letter*, *Prestwick Airport Letter*, *Scottish Air News*, *Skyward* and *South West Aviation News*.

AIRCRAFT ILLUSTRATED



Britannia Airways up-date

Sir,
Before another myth gets too far entrenched in enthusiasts' records, may I draw your attention to the entry in 'air register' on page 571 of the December 1979 edition of *Aircraft Illustrated* concerning the Boeing 737 G-BOSL?

You record the owners of this aircraft as being Overseas Services Limited. In fact

suggest G-BOSL should similarly be attributed to us.

Perhaps I might take this opportunity to list our current fleet and the aircraft we have on order. There has been much confusion in various publications, including *Civil Aircraft Markings*, apparently caused by various leases we have undertaken for overseas airlines, some of which have resulted in aircraft being temporarily re-registered overseas. In at least one case *Aircraft Illustrated* recorded one of them as 'sold abroad' which was quite incorrect.

The aircraft listed below are all in current operation with Britannia Airways in our livery.

Regn	Type	c/n	Remarks
G-AVRL	Boeing 737-204	19709	
G-AVRM	Boeing 737-204	19710	
G-AVRN	Boeing 737-204	19711	
G-AVRO	Boeing 737-204	19712	
G-AWSY	Boeing 737-204	20236	
G-AXNA	Boeing 737-204C	20282	
G-AXNB	Boeing 737-204C	20389	
G-AXNC	Boeing 737-204	20417	
G-AZNZ	Boeing 737-222	19074	Ex-United Airlines N9036U
G-BADP	Boeing 737-204 Advanced	20632	
G-BADR	Boeing 737-204 Advanced	20633	
G-BAZG	Boeing 737-204 Advanced	20806	
G-BAZH	Boeing 737-204 Advanced	20807	
G-BAZI	Boeing 737-204 Advanced	20808	
G-BECG	Boeing 737-204 Advanced	21335	
G-BECH	Boeing 737-204 Advanced	21336	
G-BFVA	Boeing 737-204 Advanced	21693	
G-BFVB	Boeing 737-204 Advanced	21694	
G-BGNW	Boeing 737-219 Advanced	21131	Ex-New Zealand NAC ZK-NAQ
A40-BG	Boeing 737-2P6 Advanced	21359	Leased from Gulf Air December 1978-December 1979
TF-VLC	Boeing 720-049B	18820	Leased from Eagleair Iceland May-November 1979
New aircraft on order are as follows:			
G-BGYJ	Boeing 737-204 Advanced	22057	Delivery January 1980
G-BGYK	Boeing 737-204 Advanced	22058	Delivery January 1980
G-BGYL	Boeing 737-204 Advanced	22059	Delivery February 1980
G-BOSL	Boeing 737-2U4 Advanced	22161	Delivery April 1980
?	Boeing 737-204 Advanced	?	Delivery September 1980
?	Boeing 737-204 Advanced	?	Delivery December 1980

the owners' correct name is *Owners' Services Limited*, better known to the public at large as OSL, the villa and apartment holiday operators, who contract Britannia Airways for much of their flying.

However, G-BOSL is being built to Britannia Airways' specification and the aircraft will, in fact, be in Britannia Airways' livery and operated and maintained within our fleet. Delivery is due in April 1980. Its correct model suffix is 2U4, not 204 as you record.

This arrangement is little different from that applying to most of the other aircraft in our fleet. Of the 19 aircraft registered to us, only three are actually owned by Britannia Airways, a further two being nominally owned by Thomson Yellow Pages, which is another company within our parent group. The other fourteen are all nominally owned by various international finance companies and merchant banks from whom we lease them, as is common practice with companies using major items of capital equipment. However, Britannia Airways is quite properly recorded as being the operator of all these aircraft, since they are leased to us for the whole of their useful lives and are ours to all intents and purposes. I

There are several recent curiosities among our registrations which might bear recording, since they are sure to give rise to speculation.

G-BGFS was originally allocated to A40-BG, and was in fact painted on the aircraft for a few days in December 1978, although it did not fly with it. We were, however, unable to obtain the release of the aircraft from the Oman register, so we had to relinquish G-BGFS. That registration was then supposed to have been reserved for the ex-New Zealand NAC aircraft, which was coming into our fleet in April 1979, having been leased overseas on various foreign registers since we bought it on 1 April 1977. However, the CAA released the registration to someone else in the meantime, so that aircraft eventually became G-BGNW, although much documentation had been prepared for it bearing G-BGFS.

Our three imminent deliveries, G-BGYJ, 'YK and 'YL, were originally allocated G-BGRU, 'RV and 'RW by the CAA. These were changed at our request because of the possibility of confusion in handwritten documentation between 'RU and 'RV, and possibly also with 'RO and 'RN.

Francis Drake' is the first to be completed, and is about to emerge from major maintenance as I write (Mr Cox's letter was dated 12 November 1979 — Ed).

The suffix 'Advanced' also appears to cause some confusion. In the early 1970's Boeing redesigned the wing high-lift devices (flaps and slots) on the 737 to improve take-off and landing performance in association with the higher gross weights to which the aircraft was being developed. This is known as the Advanced wing, and is incorporated in all our deliveries since G-BADP, including G-BGNW. Concurrently Pratt & Whitney were improving the performance of the JT8D engine, and all our deliveries from G-BAZG on, again including G-BGNW, are fitted with the improved thrust JT8D-15. They are known colloquially as the 'Dash 15 Advanced' 737. All our earlier deliveries have the JT8D-9. G-BADP and 'DR thus have the -9 engine and the Advanced wing, and are known as 'Dash 9 Advanced'.

D. A. COX
Customer Services Manager (UK),
Britannia Airways Limited,
Luton Airport, Bedfordshire

AIRCRAFT ILLUSTRATED

A Comet for the collection



John A. Bagley

THE SCIENCE MUSEUM has acquired a Comet 4B airliner from Dan-Air, one of the major British independent airlines. The aircraft was flown into the Museum's storage facility at Wroughton airfield, near Swindon, on Thursday 1 November 1979, from Gatwick. At Wroughton, it joins the pre-war Douglas DC-3 (originally delivered to United Airlines in 1936) which was acquired by the Science Museum last year.

The Comet was selected for preservation by the Science Museum as an example of the first type of British jet airliner, and is seen as a key exhibit in their new Air Transport Collection. It was designed by the de Havilland Aircraft Company at Hatfield, who were subsequently merged into Hawker-Siddeley Aviation and now form part of British Aerospace. It was powered by four Rolls-Royce Avon 525 turbine engines. The Comet 4B variant was developed primarily for British European Airways for use on routes of 300 to 2,000 miles length, carrying about 90

passengers. Eighteen Comet 4Bs were built, out of a total production run of 115 Comets.

This particular aircraft, registered G-APYD, was the last Comet 4B in service. It first flew at Hatfield on 3 May 1960; although ordered by British European Airways, it was transferred to the Greek airline, Olympic Airways, as SX-DAL on 16 May 1960. It returned to BEA on 3 November 1969, and was leased to Channel Airways of Southend from March 1970 to February 1972. It was flown to Dan-Air's maintenance base at Lasham on 14 April 1972, and first flew in Dan-Air colours on 4 August 1972.

The aircraft made its last service flight on 23 October 1979, from Heraklion, Crete into Gatwick. At the end of its 19½-year life, it had flown 32,728hr, (about 16 million miles) and made 18,586 landings.

On its final flight, the aircraft was flown by Capt Joe Wright, Capt Bryn Wayt, Eng Off Robin Durie, Air Stewardess Val Osborn, and carried Mr B. V. S. Williams, Managing Director of Dan-Air Engineering Ltd, who handed

Top: With its massive flaps much in evidence, Comet 4B G-APYD touches down at Wroughton on 1 November 1979 for the last of its 18,586 landings.

Above: G-APYD turning at the end of its final landing run. The aircraft is seen as a key exhibit in the Science Museum's new Air Transport Collection.

Photos: Science Museum

over the log-books for the aircraft to Mr Brian Lacey, Keeper of the Transport Department of the Museum and Mr John Bagley who is responsible for the National Aeronautical Collection.

Air Traffic Control and other facilities were provided by the Royal Navy Aircraft Yard at Wroughton and by the Royal Air Force at Lyneham, whose assistance is gratefully acknowledged. Wroughton is normally used only by helicopters, and Lt Cdr Bill Rothwell, the Senior Air Traffic Control Officer at RNAV Wroughton stated that this arrival of the Comet aircraft was a special event, and that there is no question of the airfield becoming available for regular fixed-wing flying activity.



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